TABLES
OF THE PROPERTIES OF
SATURATED STEAM
AND OTHER VAPORS

CECIL H. PEABODY

— Wm S. Pardoe —
— 15 Elgin Ave —
— Toronto —

WORKS OF
PROFESSOR CECIL H. PEABODY

PUBLISHED BY

JOHN WILEY & SONS.

Thermodynamics of the Steam-engine and other Heat-engines.

This work is intended for the use of students in technical schools, and gives the theoretical training required by engineers. 8vo, cloth, $5.00.

Tables of the Properties of Saturated Steam and other Vapors.

These tables were prepared for the use of students in technical schools and colleges, and of engineers in general. 8vo, cloth, $1 00.

Valve-gears for Steam-engines.

This book is intended to give engineering students instruction in the theory and practice of designing valve-gears for steam-engines. 8vo, cloth, $2.50.

Steam-boilers.

By Prof. CECIL H. PEABODY and Prof. EDWARD F. MILLER. Nearly 400 pages; 142 illustrations. 8vo, cloth, $4.00.

Manual of the Steam-engine Indicator.

154 pages; 98 figures. 12mo, cloth, $1.50.

Naval Architecture.

v+616 pages; 217 figures. 8vo, cloth, $7.50.

TABLES

OF THE PROPERTIES OF

SATURATED STEAM

AND OTHER VAPORS.

BY

CECIL H. PEABODY,

PROFESSOR OF NAVAL ARCHITECTURE AND MARINE ENGINEERING,
MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

SIXTH EDITION, REVISED AND ENLARGED.

NINTH THOUSAND.

NEW YORK:
JOHN WILEY & SONS.
LONDON: CHAPMAN & HALL, LIMITED.
1905

ROBERT DRUMMOND, ELECTROTYPER AND PRINTER, NEW YORK.

SATURATED STEAM, AND OTHER VAPORS.

A comparison of the several tables of the properties of saturated steam, expressed in English units, reveals discrepancies of considerable magnitude; and investigation shows that, while all are in some manner founded on the experiments of Regnault, various methods of calculation have been used, and in some cases other experimental data have been employed. A review of the whole subject, in connection with the preparation of notes on thermodynamics for the use of the students of the Massachusetts Institute of Technology, made it seem important to calculate a set of tables, to accompany those notes, founded on the best and most recent data.

In presenting the tables for general use, it appears proper to state in full the data and the methods of calculation employed, so that each one may see the degree of accuracy and correctness of the tables, and the reliance to be placed on them.

Tables of the properties of other vapors have been added, which will be discussed hereafter.

Pressure of Saturated Steam. — As a conclusion from all the experiments on the tension of saturated steam, Regnault gives, in the *Memoires de l'Institut de France, etc., Tome XXI.*, the following data: —

TEMPERATURE C.	PRESSURE MM. OF MERCURY.
−32	0.32
−16	1.29
0	4.60
25	23.55
50	91.98
75	288.50
100	760.00
130	2030.0
160	4651.6
190	9426.
220	17390.
−20	0.91
+40	54.91

From these data he calculated, by the aid of seven-place logarithms, the following formulæ, which give the pressure in millimetres of mercury for any temperature in degrees Centigrade: —

A. For steam from −32° to 0° C.

$$p = a + b\alpha^n.$$
$$a = -0.08038.$$
$$\log b = 9.6024724 - 10.$$
$$\log \alpha = 0.033398.$$
$$n = 32° - t.$$

B. For steam from 0° to 100° C.

$$\log p = a - b\alpha^n + c\beta^n.$$
$$a = 4.7384380.$$
$$\log b = 0.6116485.$$
$$\log c = 8.1340339 - 10.$$
$$\log \alpha = 9.9967249 - 10.$$
$$\log \beta = 0.006865036.$$
$$n = t.$$

C. For steam from 100° to 220° C.

$$\log p = a - b\alpha^n + c\beta^n.$$
$$a = 5.4583895.$$
$$\log b = 0.4121470.$$
$$\log c = 7.7448901 - 10.$$
$$\log \alpha = 9.997412127 - 10.$$
$$\log \beta = 0.007590697.$$
$$n = t - 100.$$

D. For steam from − 20° to 220° C.

$$\log p = a - b\alpha^n - c\beta^n.$$
$$a = 6.2640348.$$
$$\log b = 0.1397743.$$
$$\log c = 0.6924351.$$
$$\log \alpha = 9.994049292 - 10.$$
$$\log \beta = 9.998343862 - 10.$$
$$n = t + 20.$$

By aid of the formulæ *A* and *B*, Regnault calculated and recorded tables of the pressures of saturated steam for temperatures from − 32° to 100° C. The formula *D* was calculated from the data given above for the temperatures − 20°, + 40°, 100°, 160°, and 220° C., and was intended to represent the whole range of experiments. By this formula, instead of formula *C*, he calculated the pressures set down in his tables for temperatures from 100° C. to 220° C.

Wishing to obtain greater accuracy for meteorological work, Moritz recalculated Equation *B*, using ten-place logarithms, and obtained constants

that differ but little from those that will be given later. Some of the more recent tables in the French system were calculated by his equations.

Equations for the Pressure of Steam at Paris. — In view of the preceding statements, it appeared desirable to re-calculate the constants for Equations *B* and *C*, with a degree of accuracy that should exclude any doubt as to the reliability of the results. Accordingly, the logarithms required were taken from Vega's ten-place table, and then the remainder of the calculations were carried on with natural numbers, checking by independent methods, with the following results: —

B. For steam from 0° to 100° C.

$$\log p = a - b\alpha^n + c\beta^n.$$
$$a = 4.7393622142.$$
$$\log b = 0.6117400190.$$
$$\log c = 8.1320378383 - 10.$$
$$\log \alpha = 9.996725532820 - 10.$$
$$\log \beta = 0.006864675924.$$
$$n = t.$$

C. For steam from 100° to 220° C.

$$\log p = a - b\alpha^n + c\beta^n.$$
$$a = 5.4574301234.$$
$$\log b = 0.4119787931.$$
$$\log c = 7.7417476470 - 10.$$
$$\log \alpha = 9.99741106346 - 10.$$
$$\log \beta = 0.007642489113.$$
$$n = t - 100.$$

To show the degree of accuracy attained, the following tables are given: —

EQUATION *B*.

t.	*p.*	LOG *p* FROM TABLE OF LOGARITHMS.	LOG *p* CALCULATED BY EQUATION.
0	4.60	0.6627578317	. . . . .
25	23.55	1.3719909115	1.37199097
50	91.98	1.9636934052	1.96369346
75	288.50	2.4601458175	2.46014587
100	760	2.8808135923	2.88081365

EQUATION *C*.

t.	*p.*	LOG *p* FROM TABLE OF LOGARITHMS.	LOG *p* CALCULATED BY EQUATION.
100	760.00	2.8808135923	. . . . .
130	2030.0	3.3074960379	3.307496036
160	4651.6	3.6676023618	3.667602359
190	9426	3.9743274354	3.974327428
220	17390	4.2402995820	4.240299575

The results from Equation *C* are quite satisfactory; for the errors come in the ninth place of decimals, and one place of decimals is unavoidably lost in the application of the formula. Equation *B* was calculated after Equation *C* and the numerical work was not carried to so large a number of decimal places. For the calculation of tables, the constants are carried to seven places of significant figures only; this gives six significant figures in the result, of which five are recorded in the table.

Pressure of Steam at Latitude 45°. — French System. — It is customary to reduce all measurements to the latitude of 45°, and to sea-level. The standard thermometer should then have its boiling and freezing points determined under, or reduced to such conditions. The value of g, the acceleration due to gravity, is, at Paris, latitude 48° 50′ 14″ and 60 metres above sea-level, 9.809218 metres; and at 45°, and at sea-level, it is 9.806056 metres. Consequently, 760 mm. of mercury at 45° gives a pressure equal to that of 759.755 mm. at Paris; and this corresponds to a temperature of 99.°991 C.

In other words, the thermometer which is standard at 45° has each degree 0.99991 of the length of the degree of a thermometer standard at Paris.

To reduce Equation *B* to 45° latitude, we have

$$\log p = a + \log \frac{980.9218}{980.6056} - ba^{0.99991t} + c\beta^{0.99991t};$$

and for Equation *C*,

$$\log p = a + \log \frac{980.9218}{980.6056} - ba^{(0.99991t - 100)} + c\beta^{(0.99991t - 100)}$$

$$= a + \log \frac{980.9218}{980.6056} - ba^{-0.009}\, a^{0.99991\,(t-100)} + c\beta^{-0.009}\, \beta^{0.99991\,(t-100)}.$$

The resulting equations which were used in calculating Table III are

B. For steam from 0° to 100° C. at 45° latitude.

$$\log p = a_1 - ba_1^n + c\beta_1^n.$$
$$a_1 = 4.739502.$$
$$\log b = 0.6117400.$$
$$\log c = 8.13204 - 10.$$
$$\log a_1 = 9.996725828 - 10$$
$$\log \beta_1 = 0.0068641.$$
$$n = t.$$

C. For steam from 100° to 220° C. at 45° latitude.

$$\log p = a_1 - b_1a_1^n + c_1\beta_1^n.$$
$$a_1 = 5.457570.$$
$$\log b_1 = 0.4120021.$$
$$\log c_1 = 7.74168 - 10.$$
$$\log a_1 = 9.997411296 - 10.$$
$$\log \beta_1 = 0.0076418.$$
$$n = t - 100.$$

Pressure of Steam at Latitude 45°. — English System. — To reduce the equations for the pressure of steam, so that they will give the pressures in pounds on the square inch for degrees Fahrenheit, there are required the comparison of measures of length, and of weight, the comparison of the scales of the thermometers, and the specific gravity of mercury.

Professor Rogers (*Proceedings of the Am. Acad. of Arts and Sciences, 1882–83*, also *Additional Observations*, etc.) gives for the length of the metre, 39.3702 inches. This differs from the value given by Capt. Clarke (*Proceedings of the Royal Society, vol. xv., 1866*), by an amount that does not affect the values in the tables; his value being 39.370432 inches.

Professor Miller (*Phil. Transactions, cxlvi., 1856*) gives for the weight of one kilogram, 2.20462125 pounds.

Regnault gives, for the weight of one litre of mercury, 13.5959 kilograms. The degree Fahrenheit is $\frac{5}{9}$ of the length of the degree Centigrade.

Let $$k = \frac{13.5959 \times 2.204621}{39.3702^3};$$

then the equations *B* and *C* have for the reduction to degrees Fahrenheit, and pounds on the square inch,

$$\log p = a_1 + \log k - ba^{\frac{1}{5}n} + c\beta^{\frac{1}{5}n},$$
$$\log p = a_1 + \log k - b_1 a_1^{\frac{1}{5}n} + c_1 \beta_1^{\frac{1}{5}n}.$$

The resulting equations, which were used in calculating Tables I and II, are: —

B. **For steam from 32° to 212° F., in pounds on the square inch.**

$$\log p = a_2 - ba_2^n + c\beta_2^n.$$
$$a_2 = 3.025908.$$
$$\log b = 0.6117400.$$
$$\log c = 8.13204 - 10.$$
$$\log a_2 = 9.998181015 - 10.$$
$$\log \beta_2 = 0.0038134.$$
$$n = t - 32.$$

C. **For steam from 212° to 428° F., in pounds on the square inch.**

$$\log p = a_2 - b_1 a_2^n + c_1 \beta_2^n.$$
$$a_2 = 3.743976.$$
$$\log b_1 = 0.4120021.$$
$$\log c_1 = 7.74168 - 10.$$
$$\log a_2 = 9.998561831 - 10.$$
$$\log \beta_2 = 0.0042454.$$
$$n = t - 212.$$

All of the foregoing equations make the pressure a function of the temperature on the scale of the air-thermometer. It will be assumed that the difference between that scale and the absolute scale may be neglected.

Other Equations for the Pressure of Steam. — Rankine, in his *Steam Engine and other Prime Movers*, gives the following equation: —

$$\log p = A - \frac{B}{T} - \frac{C}{T^2}.$$

For pounds on the square inch, corresponding to degrees Fahrenheit, —

$$A = 6.1007.$$
$$\log B = 3.43642.$$
$$\log C = 5.59873.$$
$$T = t + 461.°2 \text{ F.}$$

This equation has been largely used for calculating tables on the English system. The following table will give a comparison between the results from this formula and those from Formulæ *B* and *C*.

TEMPERATURE.	PRESSURE.	
	Regnault at 45° latitude.	Rankine.
32	0.0890	0.083
77	0.4555	0.452
122	1.7789	1.78
167	5.579	5.58
212	14.99	14.70
257	33.711	33.71
302	69.27	69.21
347	129.79	129.8
392	225.56	225.9
428	336.26	336.3

Differential Co-efficient $\frac{dp}{dt}$. — As will be seen later, the differential co-efficient $\frac{dp}{dt}$ is used in calculating the volume and density of saturated vapors.

From the general equation of the form,

$$\log p = a + b\alpha^n + c\beta^n,$$

differentiation gives

$$\frac{1}{p}\frac{dp}{dt} = \frac{1}{M^2} b \log \alpha \cdot \alpha^n + \frac{1}{M^2} c \log \beta \cdot \beta^n,$$

in which M is the modulus of the common system of logarithms.

The equation may be written, —

$$\frac{1}{p}\frac{dp}{dt} = A\alpha^n + B\beta^n.$$

The calculation of the values of the constants gives the following results for latitude 45°: —

French units.

B. For 0° to 100° C., mm. of mercury,

$$\log A = 8.8512729 - 10.$$
$$\log B = 6.69305 - 10.$$
$$\log a_1 = 9.996725828 - 10.$$
$$\log \beta_1 = 0.0068641.$$

C. For 100° to 220° C., mm. of mercury.

$$\log A = 8.5495158 - 10.$$
$$\log B = 6.34931 - 10.$$
$$\log a_1 = 9.997411296 - 10.$$
$$\log \beta_1 = 0.0076418.$$

English units.

B. For 32° to 212° F., pounds on the square inch.

$$\log A = 8.5960005 - 10.$$
$$\log B = 6.43778 - 10.$$
$$\log a_2 = 9.998181015 - 10.$$
$$\log \beta_2 = 0.0038134.$$

C. For 212° to 428° F., pounds on the square inch,

$$\log A = 8.2942434 - 10.$$
$$\log B = 6.09403 - 10.$$
$$\log a_2 = 9.998561831 - 10.$$
$$\log \beta_2 = 0.0042454.$$

Heat of the Liquid and Specific Heat. — A preliminary series of experiments convinced Regnault that the specific heat of water at low temperature is unity. To test the specific heat at higher temperatures, he ran hot water from a boiler, and at a known temperature, into a calorimeter in which the temperature varied from 8° to 14° C., and the resulting upper temperature varied from 17° to 29° C. Knowing the original weight of water in the calorimeter, the weight run in from the boiler, and the initial and final temperatures in the calorimeter, he calculated the mean specific heat of water between the temperature of the boiler and the final temperatures of the calorimeter. A series of forty such experiments was made, with the temperature of the boiler varying from 108° to 192° C., from which Regnault concluded that the mean specific heat from 0° to 100° is 1.005; and from 0° to 200°, 1.016. The corresponding heat of the liquid, i.e., the heat required to raise one kilogram of water from 0° to a given temperature, t, is

For 100°	100.5
200°	203.2

Assuming an equation of the form

$$q = t + At^2 + Bt^3,$$

and solving for the two constants by aid of the two known values of q, the following equation, which is commonly used, is deduced: —

$$q = t + 0.00002t^2 + 0.0000003t^3.$$

The specific heat at any temperature is, therefore, —

$$c = \frac{dq}{dt} = 1 + 0.00004t + 0.0000009t^2.$$

These equations are for use with the Centigrade scale; for the Fahrenheit scale, a given temperature may be reduced to the Centigrade scale, and then introduced in the same equations.

The process of making the experiments is really a complex one; for the water, in leaving the boiler, has work done on it by the steam pressure in the boiler, and it has a certain velocity impress on it at the same time, and again, in entering the calorimeter, it does work against the atmospheric pressure, and the kinetic energy of its motion is changed into heat. At higher temperatures there is a double change of state; part of the water changes to steam on leaving the boiler, and that steam is condensed again in the calorimeter. It is probable that the error of neglecting the effect of these several actions is inconsiderable.

The degree of accuracy to be accorded to this work is indicated by the fact that Regnault gives four significant figures in stating the data for the calculation of the constants in the equations.

Rowland's Experiments. — A series of experiments was made by Rowland at Baltimore, to determine the mechanical equivalent of heat, which gave a delicate method of determining the heat of the liquid, and the specific heat.

The apparatus used was similar to that used by Joule, with modifications to give greater certainty of results. The calorimeter was of larger size, and the paddle had the upper vanes curved like the blades of a centrifugal pump, to give a strong circulation up through the centre, past the thermometer for taking the temperatures, and down at the outside. The paddle was driven by a petroleum engine, and the power applied was measured by making the calorimeter into a friction brake, with two arms at which the turning moment was measured. Radiation was made as small as possible, and then was made determinate by use of a water-jacket outside of the calorimeter.

The experiments consisted essentially in delivering a measured amount of work to the water in the calorimeter, and in noting the rise of temperature produced thereby.

The whole range covered by the experiments was from 2° to 41° C. The results show that 430 kilogrammetres of work are required to raise one kilogramme of water from 2° to 3° C. Assuming that the same amount will be required to raise the same weight from 0° to 1° and from 1° to 2°, the following table has been arranged from Rowland's final table of results: —

ROWLAND'S MECHANICAL EQUIVALENT OF HEAT.

Degrees, C.	Total Number of Kilogrammeters.	Mechanical Equivalent of Heat.	Heat of the Liquid, Experimental.	Heat of the Liquid, Calculated.	Degrees, C.	Total Number of Kilogrammeters.	Mechanical Equivalent of Heat.	Heat of the Liquid, Experimental.	Heat of the Liquid, Calculated.
1	430	-	1.0008	1.007	22	9424	426.1	22.095	22.093
2	860	-	2.0135	2.014	23	9850	426.0	23.093	23.091
3	1290	-	3.0204	3.022	24	10277	425.9	24.092	24.090
4	1721	-	4.0295	4.029	25	10701	425.8	25.095	25.088
5	2150	429.8	5.0339	5.036	26	11128	425.7	26.094	26.093
6	2580	429.5	6.0408	6.040	27	11553	425.6	27.090	27.048
7	3009	429.3	7.0452	7.045	28	11978	425.6	28.045	28.042
8	3439	429.0	8.0520	8.049	29	12399	425.5	29.031	29.037
9	3868	428.8	9.0564	9.054	30	12828	425.6	30.035	30.032
10	4296	428.5	10.059	10.058	31	13253	425.6	31.030	31.027
11	4723	428.3	11.058	11.060	32	13675	425.6	32.018	32.023
12	5151	428.1	12.061	12.061	33	14101	425.7	33.016	33.018
13	5578	427.9	13.060	13.063	34	14527	425.7	34.011	34.014
14	6006	427.7	14.063	14.064	35	14952	425.8	35.008	35.009
15	6433	427.4	15.065	15.066	36	15379	425.8	36.008	36.007
16	6861	427.2	16.064	16.068	37	15805	-	37.007	37.005
17	7289	427.0	17.066	17.066	38	16231	-	38.003	38.004
18	7717	426.8	18.068	18.066	39	16657	-	39.000	39.002
19	8144	426.6	19.068	19.066	40	17083	-	39.998	40.000
20	8571	426.4	20.068	20.066	41	17508	-	40.993	-
21	8997	426.2	21.065	21.064					

In the above table, column 1 gives the number of degrees above freezing on the Centigrade scale; column 2 gives the number of kilogrammetres required to raise one kilogramme of water from freezing point to the given temperature; column 3 is Rowland's mechanical equivalent of heat at the given temperature derived from 10° intervals on column 2; column 4 is obtained by dividing the numbers in column 2 by the mechanical equivalent of heat at 16⅔° C., or 62° F., from column 3; and column 5 is calculated by considering the specific heat to be constant for each five degrees of temperature. These specific heats were derived from a curve obtained by plotting temperatures for abscissæ, and heats of the liquid for ordinates. The values of the specific heats will be given later, in connection with those for higher temperatures.

A review of the preceding table shows that the specific heat at low temperatures varies quite markedly, so that it appeared advisable to investigate the effect of this variation on Regnault's experiments already quoted. This was done quite expeditiously by multiplying the mean specific heat given by him for his several experiments by the true average specific heat for the range of temperature in the calorimeter. This corrected specific heat was then used to calculate the increase of heat from the final temperature of the calorimeter to the temperature of the boiler, and that increase was added to the heat of the liquid from the table to find the heat of the liquid at the

temperature of the boiler. The results were then plotted as before, and compared with the heats of the liquid derived from Regnault's mean specific heats uncorrected. The points by the corrected method were a little more regularly arranged than the points obtained by assuming the specific heat to be unity at low temperatures; but the improvement was inconsiderable. The inequality of the specific heat at low temperatures is seldom so much as the unavoidable errors of the method.

It appeared, that if the specific heat was assumed to be constant, from 40° to 45°, from 45° to 155°, and from 155° to 200° C., the straight lines thus drawn represented the experimental values as recalculated quite nearly; and, further, they represented the uncorrected experimental values more nearly than Regnault's equation.

Specific Heat of Water. — The combination of Rowland's and Regnault's experiments on the heat of the liquid by the method described gives the specific heats set down in the following table, Centigrade scale: —

				SPECIFIC HEAT.
From 0° to	5° C.	32° to	41° F. . . .	1.0072
5°	10°	41°	50° . . .	1.0044
10°	15°	50°	59° . . .	1.0016
15°	20°	59°	68° . . .	1.
20°	25°	68°	77° . . .	0.9984
25°	30°	77°	86° . . .	0.9948
30°	35°	86°	95° . . .	0.9954
35°	40°	95°	104° . . .	0.9982
40°	45°	104°	113° . . .	1.
45°	155°	113°	311° . . .	1.008
155°	200°	311°	392° . . .	1.046

Thermal Unit. — Heat is measured in calories, or British thermal units (*BTU*). A calorie commonly is defined as the heat required to raise one kilogramme of water from freezing point to 1° C.; and a British thermal unit, that required to raise one pound from 32° to 33° F. Nothing is known about the specific heat of water from 0° to 2° C.; consequently the commonly accepted value of the thermal unit is an ideal quantity inferred from the behavior of water at higher temperatures. It is more scientific to take an easily verified quantity for the standard; and there is a practical convenience in choosing 62° F. for the standard temperature, because it is near the mean temperature of the air during experimental work. Therefore, it is near the mean temperature in the calorimeter during ordinary work with that instrument; and the specific heat of water for the range of temperature in the calorimeter may usually be considered to be unity without error, unless great refinement is desired.

The *BTU* in Tables I and II is taken to be the heat required to raise

one pound of water from 62° to 63° F. This agrees substantially with the definition of the calorie, as the heat required to raise one kilogramme of water from 15° to 16° C.

In the tables for other vapors than steam, the old definition for the calorie, and Regnault's value for the heat of the liquid, are retained, to avoid entire recalculation.

Mechanical Equivalent of Heat. — The mechanical equivalent in metre-kilogrammes of one calorie at 16⅔° C., deduced from Rowland's experiments in the third column of the table on page 58, is 427.1.

Since the value given by Joule is commonly quoted, it will be of interest to make a comparison of his latest work (1873) with Rowland's, as given in the following table: —

Temperature.	Joule's Value at Manchester, English System.	Reduced to the Air Thermometer and to the latitude of Baltimore.		Rowland's Value, corresponding.
		English.	French.	
14.7°	772.7	776.1	425.8	427.6
12.7°	774.6	778.5	427.1	428.0
15.5°	773.1	776.4	426.0	427.3
14.5°	767.0	770.5	422.7	427.5
17.3°	774.0	777.0	426.3	426.9

The value of g at Baltimore, latitude 39° 17′, is 980.05 centimetres therefore, reducing to 45° of latitude, and at the sea level, the value of the mechanical equivalent of heat is

$$J = 426.9.$$

To reduce to the English system, multiply by $\frac{5}{9}$, and by the length of the metre in feet, so that

$$J = 778.$$

Total Heat. — This term is defined as the heat required to raise a unit of weight of water from freezing point to a given temperature, and to entirely evaporate it at that temperature. The experiments made by Regnault were in the reverse order; that is, steam was led from a boiler into the calorimeter, and there condensed. Knowing the initial and final weights of the calorimeter, the temperature of the steam, and the initial and final temperatures of the water in the calorimeter, he was able, after applying the necessary corrections, to calculate the total heats for the several experiments.

As a conclusion of the work, he gives the following values for the total heats: —

10°	610	By equation, 609.6
63°	625	625.2
100°	637	
195°	666	

Assuming an equation of the form

$$\lambda = A + Bt,$$

Regnault calculated the constants from the values given for 100° and 195°, and gives the equation

$$\lambda = 606.5 + 0.305t.$$

Wishing to see the effect of the varying value of the specific heat at low temperatures, I recalculated the total heats given by experiment, by a method resembling that used in recalculation of the heats of the liquid, and plotted the results together with Regnault's values uncorrected. The recalculated points were a little more regular than the original ones, and lay nearer the line represented by the above equation. Especially did the recalculated points for those experiments, for which the true mean specific heat of the water in the calorimeter was nearly unity, lie near that line. It therefore appears that the equation represents our best knowledge of the total heat of steam.

For the Fahrenheit scale the equation becomes

$$\lambda = 1091.7 + 0.305\ (t - 32).$$

Heat of Vaporization. — If the heat of the liquid be subtracted from the total heat, the remainder is called the heat of vaporization, and is represented by r, so that

$$r = \lambda - q.$$

Internal and External Latent Heat. — The heat of vaporization overcomes external pressure, and changes the state from liquid to vapor at constant temperature and pressure. Let the specific volume of the saturated vapor be s, and that of the liquid be σ, then the change of volume is $s - \sigma = u$, on passing from the liquid to the vaporous state. The external work is

$$p(s - \sigma) = pu,$$

and the corresponding amount of heat, or the external latent heat, is

$$Ap(s - \sigma) = Apu,$$

A being the reciprocal of the mechanical equivalent of heat.

The heat required to do the disgregation work, or the internal latent heat, is

$$\rho = r - Apu.$$

Specific Volume and Density of Steam. — On account of the great difficulty of direct determination of the weight of saturated steam, it is customary to calculate the specific volume of steam by aid of the following equation, derived by the application of the principles of thermo-dynamics to the general equation representing the properties of saturated vapor: —

$$s = \frac{r}{AT} \cdot \frac{1}{\frac{dp}{dt}} + \sigma,$$

in which A is the reciprocal of the mechanical equivalent of heat, T is the temperature from the absolute zero, and σ is the volume of one unit of weight of the liquid from which the vapor is formed. The differential co-efficient $\frac{dp}{dt}$ can be calculated by aid of the equations on page 11.

The absolute temperature is obtained by adding 273.7 to the temperature in degrees Centigrade, or 460.7 to the temperature in degrees Fahrenheit.

The volumes and densities of saturated steam given in Tables I, II, and III, were calculated by this method.

It is of interest to consider the degree of accuracy that may be expected from this method of calculating the density of saturated vapor. The value of r repends on λ and q; for the first, Regnault gives three figures in the data from which the empirical equation is deduced, and the experimental work does not indicate a greater degree of accuracy. The fourth figure, if stated, is likely to be in error to the extent of five units. The value of T is commonly stated in four figures, of which the last may be in error by two units. A, as determined by Rowland, has four figures, the last being uncertain to the extent of one or two units. The differential co-efficient $\frac{dp}{dt}$ is deduced from the equations for calculating p; and those equations are derived from data having five places of significant figures. Now the Equations B and C, for steam at 45° of latitude for the English system give a pressure of 14.6967 pounds on the square inch; but the specific volume calculated by aid of Equation B is 26.550 cubic feet, while Equation C gives 26.637 cubic feet. The mean, 26.60, differs from either extreme by about one in seven hundred. This discrepancy is due to the fact that the curves represented by Equations B and C meet at the common temperature, 212°, but do not have a common tangent. Since the equations are empirical and not logical, the error or uncertainty is unavoidable, and all calculated specific volumes are affected by a similar uncertainty. The greatest probable error is in determining r, for which it may be about one in one thousand. The error introduced into this equation by using the values of A in common use, that is, 772 instead of 778, is about one in one hundred.

Tate and Fairbairn's Experiments. — In 1860 an attempt was made by Tate and Fairbairn to determine the specific volume of steam by direct experiment. The following table, taken from the *Philosophical Transactions, Vol. cl.*, gives the results of all their experiments, together with the volumes calculated by their empirical formula,

$$V = 25.62 + \frac{49513}{P + 0.72}.$$

	Pressure in Inches of Mercury. P.	Maximum Temperature, Fahrenheit, of Saturation. T	Specific Volume from Experiments. V.	Specific Volume from Formula. V.	Error of Formula.
1	5.35	130.77	8275.3	8183	$-\frac{1}{90}$
2	8.62	155.33	5333.5	5326	$-\frac{1}{710}$
3	9.45	159.36	4920.2	4900	$-\frac{1}{243}$
4	12.47	170.92	3722.6	3766	$+\frac{1}{87}$
5	12.61	171.48	3715.1	3740	$+\frac{1}{149}$
6	13.62	174.92	3438.1	3478	$+\frac{1}{86}$
7	16.01	182.30	3051.0	2985	$-\frac{1}{46}$
8	18.36	188.30	2623.4	2620	$+\frac{1}{781}$
9	22.88	198.78	2149.5	2124	$-\frac{1}{90}$
1′	53.61	242.90	943.1	937	$-\frac{1}{153}$
2′	55.52	244.82	908.0	906	$-\frac{1}{454}$
3′	55.89	245.22	892.5	900	$+\frac{1}{71}$
4′	66.84	255.50	759.4	758	$-\frac{1}{759}$
5′	76.20	263.14	649.2	669	$+\frac{1}{33}$
6′	81.53	267.21	635.3	628	$-\frac{1}{91}$
7′	84.20	269.20	605.7	608	$+\frac{1}{304}$
8′	92.23	274.76	584.4	562	$-\frac{1}{26}$
9′	90.08	273.30	543.2	545	$+\frac{1}{31}$
10′	99.60	279.42	515.0	519	$+\frac{1}{128}$
11′	104.54	282.58	497.2	496	$-\frac{1}{307}$
12′	112.78	287.25	458.3	461	$+\frac{1}{182}$
13′	122.25	292.53	433.1	428	$-\frac{1}{86}$
14′	114.25	288.25	449.6	456	$+\frac{1}{76}$

It is apparent that the errors of this formula are much larger than the probable errors of the thermo-dynamic method.

The following table, giving the volumes in cubic metres of one kilogramme of saturated steam, shows the comparison of the two methods: —

	0° C.	50° C.	100° C.	150° C.	200° C.
By equation $s = \frac{\gamma}{AT} \cdot \frac{dt}{dp} + \sigma$ . .	211.5	12.11	1.660	0.3875	0.1277
From equation $V = 25.62 + \frac{49153}{P + 0.72}$,	54.97	11.43	1.643	0.3706	0.1343

Steam Entropy. — From the second law of thermo-dynamics may be deduced the equation

$$d\phi = \frac{dQ}{T},$$

in which ϕ is the entropy, dQ is the heat applied or withdrawn, and T is the absolute temperature. Since the entropy depends on the state of the substance only, and not on the method of arriving at that state, we may calculate the increase of entropy in one unit of weight of a given mixture of water and steam, above the entropy of one pound of water at freezing point, in the following method. Suppose that one unit of weight of water is raised from

freezing point to the temperature t, and that the portion x is then changed into steam. During the first operation the change of entropy will be

$$\theta = \int_0^t \frac{dq}{T} = \int_0^t \frac{cdt}{T}.$$

During the second operation the change of entropy will be

$$\frac{xr}{T},$$

since the heat is added at the constant temperature t. The entire change of entropy will be

$$\phi = \frac{xr}{T} + \int_0 \frac{cdt}{T} = \frac{xr}{T} + \theta.$$

At any other state the entropy of a unit of weight of a mixture of steam and water will be

$$\phi_1 = \frac{x_1 r_1}{T_1} + \theta_1,$$

and the change of entropy will be

$$\phi - \phi_1 = \frac{xr}{T} + \theta - \frac{x_1 r_1}{T_1} - \theta_1.$$

During an adiabatic change no heat is transmitted, and the entropy is constant.

$$\frac{xr}{T} + \theta = \frac{x_1 r_1}{T_1} + \theta_1.$$

When the initial state including the value of x is known, and also the final temperature or pressure, the final value of x_1 may be calculated by the above equation; and the initial and final volumes may be found by the equations

$$v = xu + \sigma, \qquad v_1 = x_1 u_1 + \sigma;$$

the value of u for a given temperature or pressure, from the equation,

$$s = u + \sigma.$$

Entropy of the Liquid. — When the specific heat of a liquid is known in terms of the temperature, the entropy of the liquid,

$$\theta = \int_0^t \frac{cdt}{T},$$

is readily calculated. For water we have, for example, the entropy of the liquid at 13° C.

$$1.0072 \log_e \frac{T_5}{T_0} + 1.0044 \log_e \frac{T_{10}}{T_5} + 1.0016 \log_e \frac{T_{13}}{T_{10}}.$$

For other liquids having the general formula for the heat of the liquid,

$$q = at + bt^2 + ct^3,$$

the entropy is

$$\theta = \int_0^t \frac{(a + 2bt + 3ct^2)\, dt}{T}.$$

Other Vapors. — Tables IV to IX are taken from Zeuner's *Mechanischen Wärmetheorie*. His values for the specific volume and density were calculated with 273 for the absolute temperature of 0° C., and with 424 for the mechanical equivalent of heat. To bring these tables into accord with Tables I, II, and III, the values of the specific volume and density have been modified by using 273.7 for the absolute temperature of 0° C., and 426.7 for the mechanical equivalent of heat at Paris.

The equations by which the tables were calculated, taken from Regnault's memoirs, *Académie des Sciences*, *Comptes rendus*, *Tome XXXVI*, are here assembled, together with Zeuner's equations for the differential co-efficient, $\frac{1}{p}\frac{dp}{dt}$.

TEMPERATURE AND PRESSURE.

1	log p 2	a 3	b 4	c 5
Alcohol	$a - ba^n + c\beta^n$	5.4562028	4.9809960	0.0485397
Ether	$a + ba^n - c\beta^n$	5.0286298	0.0002284	3.1906390
Chloroform	$a - ba^n - c\beta^n$	5.2253893	2.9531281	0.0668673
Carbon bisulphide .	$a - ba^n - c\beta^n$	5.4011662	3.4405663	0.2857386
Carbon tetrachloride	$a - ba^n - c\beta^n$	12.0962331	9.1875180	1.9674890

TEMPERATURE AND PRESSURE — *Concluded.*

	log a. 6	log β. 7	n 8	Limits. 9
Alcohol	$\bar{1}.99708557$	$\bar{1}.9409485$	t+20	−20°,+150°C.
Ether	0.0145775	$\bar{1}.996877$	t+20	−20°,+120°
Chloroform	$\bar{1}.9974144$	$\bar{1}.9868176$	t−20	+20°,+164°
Carbon bisulphide .	$\bar{1}.9977628$	$\bar{1}.9911997$	t+20	−20°,+140°
Carbon tetrachloride .	$\bar{1}.9997120$	$\bar{1}.9949780$	t+20	−20°,+188°

The equation for the temperature and pressure of the saturated vapor of aceton, as recalculated by Zeuner, is, —

$$\log p = a - ba^n + c\beta^n.$$
$$a = 5.3085419.$$
$$\log ba^n = + 0.5312766 - 0.0026148t.$$
$$\log c\beta^n = - 0.9645222 - 0.0215592t.$$

$$\frac{1}{p}\frac{dp}{dt} = A\alpha^n + B\beta^n$$

From Zeuner's *Wärmetheorie.*

	Sign.		Log ($A\alpha^n$)	Log ($B\beta^n$)
	$A\alpha^n$	$B\beta^n$		
Alcohol	+	−	$-1.1720041-0.0020143t$	$-2.9002701-0.0500515t$
Ether	+	+	$-1.3390924-0.0031223t$	$-4.4616386+0.0145775t$
Chloroform . . .	+	+	$-1.3410130-0.0025850t$	$-2.0007124-0.0131824t$
Carbon bisulphide .	+	+	$-1.4330778-0.0022372t$	$-2.0511078-0.0089003t$
Carbon tetrachloride,	+	+	$-1.8011078-0.0002880t$	$-1.3812195-0.0040220t$
Aceton	+	+	$-1.3208525-0.0026148t$	$-1.9064582-0.0215502t$

t, temperature C.

HEAT OF THE LIQUID.

Alcohol . . .	$q = 0.54754t + 0.0011218t^2 + 0.000002206t^3$
Ether . . .	$q = 0.52901t + 0.0002959t^2$
Chloroform . .	$q = 0.23235t + 0.0000507t^2$
Carbon bisulphide .	$q = 0.23523t + 0.0000815t^2$
Carbon tetrachloride .	$q = 0.19798t + 0.0000906t^2$
Aceton . . .	$q = 0.50643t + 0.0003965t^2$

TOTAL HEAT.

Ether . . .	$\lambda = 94 + 0.45t - 0.00055556t^2$
Chloroform . .	$\lambda = 67 + 0.1375t$
Carbon bisulphide .	$\lambda = 90 - 0.14601t - 0.0004123t^2$
Carbon tetrachloride .	$\lambda = 52 + 0.14625t - 0.000172t^2$
Aceton . . .	$\lambda = 140.5 + 0.36644t - 0.000516t^2$

The total heat of alcohol varies in so irregular a manner that no equation can be given for it.

Zeuner gives the following empirical equations for calculating the heat equivalent of the internal work, which are proposed to lessen the labor of calculation.

HEAT EQUIVALENT OF INTERNAL WORK.

Water . . .	$\rho = 575.40 - 0.791t$
Ether . . .	$\rho = 86.54 - 0.10648t - 0.0007160t^2$
Chloroform . .	$\rho = 62.44 - 0.11282t - 0.0000140t^2$
Carbon bisulphide .	$\rho = 82.79 - 0.11446t - 0.0004020t^2$
Carbon tetrachloride .	$\rho = 48.57 - 0.06844t - 0.0002080t^2$
Aceton . . .	$\rho = 131.63 - 0.20184t - 0.0006280t^2$

Sulphur Dioxide and Ammonia. — The use of ice-machines has brought into prominence liquids which vaporize at low temperatures. For two such liquids, sulphur dioxide and ammonia, Regnault gives the following equations for temperature and pressure: —

SULPHUR DIOXIDE.	AMMONIA.
$\log p = a - ba^n - c\beta^n$	$\log p = a - ba^n - c\beta^n$
$a = 5.6663790$	$a = 11.5043330$
$b = 3.0146890$	$b = 7.4503520$
$c = 0.1465400$	$c = 0.9499674$
$\log a = \bar{1}.9972989$	$\log a = \bar{1}.9996014$
$\log \beta = \bar{1}.9872900$	$\log \beta = \bar{1}.9939729$
$n = t + 28$	$n = t + 22$
Limits, -28, $+62$.	Limits, -22, $+82$.

Unfortunately the heat of the liquid and the total heat for these substances have not been determined. We have, however, some of the properties of these substances in the gaseous state or more properly in the state of superheated vapors.

Now, it has been shown by Zeuner that superheated steam may have its properties represented by the equation

$$pv = BT - Cp^a,$$

in which p is the pressure in pounds on the square foot or kilograms on the square meter, v is the volume of a pound in cubic feet or of a kilogram in cubic meters, and T is the absolute temperature. The constants have the following values when calculated from the properties of saturated steam:

French units, ...	$B = 51.3$	$C = 198$	$a = \frac{1}{4}$.
English units, ...	$B = 93.5$	$C = 971$	$a = \frac{1}{4}$.

It was first proposed by Ledoux to find similar equations to represent the properties of superheated sulphur dioxide and ammonia, and to use such equations for calculating approximate tables of the properties of these vapors when saturated, just as the tables of the properties of saturated steam had been used in establishing the equation for superheated steam.

In the *Thermodynamics of the Steam-engine* by the author, pages 452 to 459, this calculation has been carried out with the best ascertained properties of the superheated vapors of sulphor dioxide and ammonia with the following results:

	SULPHUR DIOXIDE.	AMMONIA.
French units,	$pv = 14.5\ T - 48p^{0.22}$	$pv = 54.3\ T - 142p^{\frac{1}{4}}$
English units,	$pv = 26.4\ T - 184p^{0.22}$	$pv = 99\ T - 710p^{\frac{1}{4}}$

The application of these equations to the vapors when saturated gives the following results:

Heat of Vaporization.

	SULPHUR DIOXIDE.	AMMONIA.
French units,	$r = 98 - 0.27t$	$r = 300 - 0.8t.$
English units,	$r = 176 - 0.27(t - 32)$	$r = 540 - 0.8(t - 32).$

Specific Heat of the Liquid.

SULPHUR DIOXIDE.	AMMONIA.
$c = 0.4$	$c = 1.1$

Tables X and XI were calculated by aid of the equations written, and may be of use for approximate calculations, in default of more reliable tables.

Specific Volume of Liquids. — Table XII was taken from the *Phys.-Chem. Tabellen* of Landolt and Börnstein.

Volume of Water. — Table XIII gives the volumes of water compared with its volume at 4°. From 0° to 100° C., the values are those given by Rossetti. Above 100°, the values are those calculated by the equations given by Hirn in the *Annales de Chimie et de Physique, 1867.*

Volumes of Liquids. — The volumes of liquids at high temperatures, compared with the volume at freezing point, are represented by the following equations given by Hirn in the *Annales:* —

		Logs.
Water 100° C. to 200° C. (vol. at 4° C. = unity)	$v = 1 + 0.00010807875t$	6.0301445 − 10
	$+ 0.000000007.9534t^2$	4.4781862 − 10
	$+ 0.000000002873.0422t^3$	1.4583419 − 10
	$- 0.0000000000006457031t^4$	8.8225409 − 20
Alcohol 30° C. to 160° C. (vol. at 0° C. = unity)	$v = 1 + 0.0007389226t$	6.8685091 − 10
	$+ 0.0000105235t^2$	3.0234492 − 10
	$- 0.000000002480842t^3$	2.3940517 − 10
	$+ 0.000000000040413567t^4$	0.6065278 − 10
Ether 30° C. to 130° C. (vol. at 0° C. = unity)	$v = 1 + 0.0013480059t$	7.1296817 − 10
	$+ 0.000005537t^2$	4.8164896 − 10
	$- 0.000000034490756t^3$	2.5377028 − 10
	$+ 0.000000000337720624t^4$	0.5285571 − 10
Carbon bisulphide 30° to 160° C. (vol. at 0° C. = unity)	$v = 1 + 0.0011680559t$	7.0674636 − 10
	$+ 0.000001648950887^2$	4.2172103 − 10
	$- 0.000000000811190621^3$	0.0091259 − 10
	$+ 0.000000000006046580^4$	7.7849494 − 20
Carbon tetrachloride 30° to 160° C. (vol. at 0° C. = unity)	$v = 1 + 0.0010671883t$	7.0282400 − 10
	$+ 0.000005565137887^2$	4.5520763 − 10
	$- 0.000000014949281^3$	2.1746502 − 10
	$+ 0.000000000085182318^4$	9.9303494 − 20

Other Data. — For convenience the following data are assembled: —

Length of the metre in inches	39.3702 (Rogers) 39.370432 (Clarke)
Weight of the kilogramme in pounds . . .	2.20462125
Weight of 1 litre (1 cu. decimetre) of mercury .	13.5959 kilos.
One horse power, in foot pounds per second .	550
Cheval à vapeur, in kilogrammetres per second .	75
Normal pressure of the atmosphere	760 mm. of mercury. 10,333 kilos per sq. m. 14.6967 lbs. per sq. in. 2116.32 lbs. per. sq. ft
Absolute temperature of freezing point . .	273.°7 C. 492.°7 F.

Explanation of the Tables. — In Table I, the first column gives the temperature, t, of saturated steam.

The second column gives the corresponding pressure, p, in pounds on the square inch, above an absolute vacuum; the differences are placed between the two numbers from which they are derived. For example, the pressure at 40° F. is 0.1216 pounds per square inch; and the difference to be used in interpolation, and placed half a line lower, is 48.

The third column gives the heat of the liquid, q, required to raise the temperature of one pound of water from 32° F. to a given temperature.

The fourth column gives the total heat, λ, required to raise one pound of water from 32° F. to a given temperature, and to entirely vaporize it under the pressure due to that temperature.

The fifth column gives the heat of vaporization, or the heat required to vaporize one pound of water at a given temperature, under the pressure corresponding.

The sixth column gives the heat required to do the disgregation work during the vaporization of one pound of water.

The seventh column gives the heat required to overcome the external pressure, and do the work of increasing the volume from σ to s.

The eighth column gives the entropy of the liquid.

The ninth and tenth columns give the specific volume, or volume in cubic feet, of one pound of saturated steam, and the density or weight of one cubic foot in pounds.

Table II differs from Table I in that it is arranged to give the properties of saturated steam for each pound of pressure.

Table III gives the properties of saturated steam in French units; and Tables IV to XI give the properties of other saturated vapors in the same units. It is to be noted that the pressures in Tables IV to IX are in millimetres of mercury; in Tables X and XI, are in kilogrammes per square metre.

TABLE I.

SATURATED STEAM.

ENGLISH UNITS.

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\alpha$	Entropy of the Liquid. $\int \frac{dq}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot.	Temperature, Degrees Fahr. t
32	0.0800	0	1091.7	1091.7	1035.9	55.8	0.0000	3287	0.0003052	32
33	0.0926	1.01	1092.0	1091.0	1035.1	55.9	0.0020	3290	0.0003067	33
34	0.0983	2.01	1092.3	1090.3	1034.3	56.0	0.0041	3138	0.0003187	34
35	0.1002	3.02	1092.6	1089.6	1033.6	56.0	0.0061	3022	0.0003309	35
36	0.1042	4.03	1092.9	1088.9	1032.8	56.1	0.0081	2910	0.0003436	36
37	0.1083	5.04	1093.2	1088.2	1032.0	56.2	0.0101	2803	0.0003568	37
38	0.1126	6.04	1093.5	1087.5	1031.3	56.2	0.0122	2700	0.0003704	38
39	0.1170	7.05	1093.8	1086.7	1030.4	56.3	0.0142	2601	0.0003845	39
40	0.1216	8.06	1094.1	1086.0	1029.6	56.4	0.0162	2506	0.0003990	40
41	0.1264	9.06	1094.4	1085.3	1028.8	56.5	0.0182	2415	0.0004141	41
42	0.1313	10.07	1094.8	1084.7	1028.1	56.6	0.0202	2328	0.0004296	42
43	0.1364	11.07	1095.1	1084.0	1027.3	56.7	0.0222	2244	0.0004456	43
44	0.1417	12.08	1095.4	1083.3	1026.5	56.8	0.0242	2164	0.0004621	44
45	0.1471	13.08	1095.7	1082.6	1025.8	56.8	0.0262	2087	0.0004792	45
46	0.1528	14.09	1096.0	1081.9	1025.0	56.9	0.0282	2013	0.0004968	46
47	0.1586	15.09	1096.3	1081.2	1024.2	57.0	0.0302	1942	0.0005149	47
48	0.1646	16.10	1096.6	1080.5	1023.4	57.1	0.0322	1874	0.0005336	48
49	0.1708	17.10	1096.9	1079.8	1022.6	57.2	0.0341	1808	0.0005530	49
50	0.1773	18.10	1097.2	1079.1	1021.8	57.3	0.0361	1745	0.0005731	50
51	0.1839	19.11	1097.5	1078.4	1021.1	57.3	0.0381	1685	0.0005937	51
52	0.1908	20.11	1097.8	1077.7	1020.3	57.4	0.0400	1626	0.0006150	52
53	0.1979	21.11	1098.1	1077.0	1019.5	57.5	0.0420	1570	0.0006369	53
54	0.2052	22.11	1098.4	1076.3	1018.7	57.6	0.0439	1516	0.0006595	54
55	0.2128	23.11	1098.7	1075.6	1017.9	57.7	0.0459	1465	0.0006829	55
56	0.2206	24.11	1099.0	1074.9	1017.1	57.8	0.0478	1415	0.0007069	56
57	0.2287	25.12	1099.3	1074.2	1016.3	57.9	0.0497	1367	0.0007317	57
58	0.2370	26.12	1099.6	1073.5	1015.6	57.9	0.0517	1321	0.0007571	58
59	0.2456	27.12	1099.9	1072.8	1014.8	58.0	0.0536	1276	0.0007834	59
60	0.2545	28.12	1100.2	1072.1	1014.0	58.1	0.0555	1234	0.0008104	60
61	0.2637	29.12	1100.5	1071.4	1013.2	58.2	0.0574	1193	0.0008384	61
62	0.2731	30.12	1100.9	1070.8	1012.5	58.3	0.0594	1153	0.0008673	62
63	0.2829	31.12	1101.2	1070.1	1011.7	58.4	0.0613	1115	0.0008969	63

SATURATED STEAM — *Continued.*

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
64	0.2929_{104}	32.12	1101.5	1069.4	1010.9	58.5	0.0632	1078_{36}	0.0009273_{313}	64
65	0.3033_{107}	33.12	1101.8	1068.7	1010.1	58.6	0.0651	1042_{35}	0.0009586_{325}	65
66	0.3140_{110}	34.12	1102.1	1068.0	1009.4	58.6	0.0670	1009_{35}	0.0009911_{329}	66
67	0.3250_{114}	35.12	1102.4	1067.3	1008.6	58.7	0.0689	976.3_{316}	0.001024_{35}	67
68	0.3364_{117}	36.12	1102.7	1066.6	1007.8	58.8	0.0708	944.7_{304}	0.001059_{35}	68
69	0.3481_{121}	37.12	1103.0	1065.9	1007.0	58.9	0.0727	914.3_{293}	0.001094_{36}	69
70	0.3602_{124}	38.11	1103.3	1065.2	1006.2	59.0	0.0745	885.0_{283}	0.001130_{37}	70
71	0.3726_{128}	39.11	1103.6	1064.5	1005.4	59.1	0.0764	856.7_{272}	0.001167_{38}	71
72	0.3854_{132}	40.11	1103.9	1063.8	1004.6	59.2	0.0783	829.5_{263}	0.001205_{40}	72
73	0.3986_{136}	41.11	1104.2	1063.1	1003.8	59.3	0.0802	803.2_{253}	0.001245_{41}	73
74	0.4122_{140}	42.11	1104.5	1062.4	1003.0	59.4	0.0820	777.9_{244}	0.001286_{41}	74
75	0.4262_{144}	43.11	1104.8	1061.7	1002.3	59.4	0.0839	753.5_{236}	0.001327_{43}	75
76	0.4406_{149}	44.11	1105.1	1061.0	1001.5	59.5	0.0858	729.9_{228}	0.001370_{44}	76
77	0.4555_{153}	45.10	1105.4	1060.3	1000.7	59.6	0.0876	707.1_{219}	0.001414_{45}	77
78	0.4708_{157}	46.10	1105.7	1059.6	999.9	59.7	0.0895	685.2_{211}	0.001459_{46}	78
79	0.4865_{162}	47.09	1106.0	1058.9	999.1	59.8	0.0913	664.1_{203}	0.001505_{48}	79
80	0.5027_{167}	48.09	1106.3	1058.2	998.3	59.9	0.0932	643.8_{197}	0.001553_{49}	80
81	0.5194_{171}	49.08	1106.6	1057.5	997.5	60.0	0.0950	624.1_{191}	0.001602_{51}	81
82	0.5365_{177}	50.08	1107.0	1056.9	996.8	60.1	0.0968	605.0_{184}	0.001653_{52}	82
83	0.5542_{181}	51.07	1107.3	1056.2	996.0	60.2	0.0987	586.6_{178}	0.001705_{53}	83
84	0.5723_{187}	52.07	1107.6	1055.5	995.2	60.3	0.1005	568.8_{171}	0.001758_{55}	84
85	0.5910_{192}	53.06	1107.9	1054.8	994.4	60.4	0.1023	551.7_{165}	0.001813_{56}	85
86	0.6102_{197}	54.06	1108.2	1054.1	993.7	60.4	0.1041	535.2_{160}	0.001869_{57}	86
87	0.6299_{203}	55.05	1108.5	1053.4	992.9	60.5	0.1060	519.2_{155}	0.001926_{59}	87
88	0.6502_{209}	56.05	1108.8	1052.7	992.1	60.6	0.1078	503.7_{148}	0.001985_{60}	88
89	0.6711_{214}	57.04	1109.1	1052.1	991.4	60.7	0.1096	488.9_{143}	0.002045_{62}	89
90	0.6925_{221}	58.04	1109.4	1051.4	990.6	60.8	0.1114	474.6_{139}	0.002107_{64}	90
91	0.7146_{226}	59.03	1109.7	1050.7	989.8	60.9	0.1132	460.7_{136}	0.002171_{66}	91
92	0.7372_{233}	60.03	1110.0	1050.0	989.0	61.0	0.1150	447.1_{131}	0.002237_{67}	92
93	0.7605_{239}	61.03	1110.3	1049.3	988.2	61.1	0.1168	434.0_{125}	0.002304_{68}	93
94	0.7844_{246}	62.02	1110.6	1048.6	987.4	61.2	0.1186	421.5_{122}	0.002372_{71}	94
95	0.8090_{252}	63.02	1110.9	1047.9	986.6	61.3	0.1204	409.3_{118}	0.002443_{73}	95
96	0.8342_{259}	64.01	1111.2	1047.2	985.8	61.4	0.1222	397.5_{114}	0.002516_{74}	96
97	0.8601_{266}	65.01	1111.5	1046.5	985.0	61.5	0.1240	386.1_{110}	0.002590_{76}	97
98	0.8867_{273}	66.01	1111.8	1045.8	984.2	61.6	0.1258	375.1_{107}	0.002666_{78}	98
99	0.9140_{281}	67.01	1112.1	1045.1	983.4	61.7	0.1275	364.4_{104}	0.002744_{80}	99
100	0.9421_{288}	68.01	1112.4	1044.4	982.7	61.7	0.1293	354.0_{99}	0.002824_{82}	100
101	0.9709_{295}	69.01	1112.7	1043.7	981.9	61.8	0.1311	344.1_{96}	0.002906_{84}	101
102	1.0004_{303}	70.00	1113.1	1043.1	981.2	61.9	0.1329	334.5_{93}	0.002990_{85}	102
103	1.0307_{312}	71.00	1113.4	1042.4	980.4	62.0	0.1347	325.2_{91}	0.003075_{88}	103

SATURATED STEAM — *Continued.*

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int \frac{dH}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
104	1.0619_{319}	72.0	1113.7	1041.7	979.6	62.1	0.1364	316.1_{88}	0.003163_{91}	104
105	1.0938_{328}	73.0	1114.0	1041.0	978.8	62.2	0.1382	307.3_{85}	0.003254_{93}	105
106	1.1266_{336}	74.0	1114.3	1040.3	978.0	62.3	0.1400	298.8_{82}	0.003347_{94}	106
107	1.1602_{345}	75.0	1114.6	1039.6	977.2	62.4	0.1417	290.6_{79}	0.003441_{96}	107
108	1.1947_{354}	76.0	1114.9	1038.9	976.4	62.5	0.1435	282.7_{77}	0.003537_{99}	108
109	1.2301_{362}	77.0	1115.2	1038.2	975.6	62.6	0.1452	275.0_{75}	0.003636_{102}	109
110	1.2663_{372}	78.0	1115.5	1037.5	974.8	62.7	0.1470	267.5_{72}	0.003738_{104}	110
111	1.3035_{381}	79.0	1115.8	1036.8	974.0	62.8	0.1487	260.3_{70}	0.003842_{106}	111
112	1.3416_{391}	80.0	1116.1	1036.1	973.2	62.9	0.1505	253.3_{68}	0.003948_{109}	112
113	1.3807_{400}	81.0	1116.4	1035.4	972.4	63.0	0.1522	246.5_{66}	0.004057_{111}	113
114	1.4207_{411}	82.0	1116.7	1034.7	971.6	63.1	0.1540	239.9_{64}	0.004168_{115}	114
115	1.4618_{421}	83.0	1117.0	1034.0	970.8	63.2	0.1558	233.5_{62}	0.004283_{116}	115
116	1.5039_{431}	84.0	1117.3	1033.3	970.0	63.3	0.1575	227.3_{60}	0.004399_{120}	116
117	1.5470_{442}	85.0	1117.6	1032.6	969.2	63.4	0.1592	221.3_{58}	0.004519_{121}	117
118	1.5912_{452}	86.0	1117.9	1031.9	968.4	63.5	0.1610	215.5_{56}	0.004640_{124}	118
119	1.6364_{464}	87.0	1118.2	1031.2	967.6	63.6	0.1627	209.9_{55}	0.004764_{128}	119
120	1.6828_{474}	88.1	1118.5	1030.4	966.7	63.7	0.1645	204.4_{53}	0.004892_{130}	120
121	1.7302_{487}	89.1	1118.8	1029.7	966.0	63.7	0.1662	199.1_{52}	0.005022_{134}	121
122	1.7789_{498}	90.1	1119.2	1029.1	965.3	63.8	0.1679	193.9_{50}	0.005156_{137}	122
123	1.8287_{510}	91.1	1119.5	1028.4	964.5	63.9	0.1697	188.9_{48}	0.005293_{139}	123
124	1.8797_{521}	92.1	1119.8	1027.7	963.7	64.0	0.1714	184.1_{47}	0.005432_{142}	124
125	1.9318_{534}	93.1	1120.1	1027.0	962.9	64.1	0.1731	179.4_{46}	0.005574_{146}	125
126	1.9852_{547}	94.1	1120.4	1026.3	962.1	64.2	0.1748	174.8_{44}	0.005720_{148}	126
127	2.0399_{560}	95.1	1120.7	1025.6	961.3	64.3	0.1765	170.4_{43}	0.005868_{152}	127
128	2.0959_{574}	96.1	1121.0	1024.9	960.5	64.4	0.1783	166.1_{42}	0.006020_{156}	128
129	2.1533_{586}	97.1	1121.3	1024.2	959.7	64.5	0.1800	161.9_{41}	0.006176_{160}	129
130	2.2119_{600}	98.1	1121.6	1023.5	958.9	64.6	0.1817	157.8_{39}	0.006336_{162}	130
131	2.2719_{614}	99.1	1121.9	1022.8	958.1	64.7	0.1834	153.9_{38}	0.006498_{166}	131
132	2.3333_{628}	100.2	1122.2	1022.0	957.2	64.8	0.1851	150.1_{37}	0.006664_{169}	132
133	2.3961_{642}	101.2	1122.5	1021.3	956.4	64.9	0.1868	146.4_{36}	0.006833_{172}	133
134	2.4603_{658}	102.2	1122.8	1020.6	955.6	65.0	0.1885	142.8_{36}	0.007005_{176}	134
135	2.5261_{671}	103.2	1123.1	1019.9	954.8	65.1	0.1902	139.2_{34}	0.007181_{180}	135
136	2.5932_{687}	104.2	1123.4	1019.2	954.0	65.2	0.1919	135.8_{33}	0.007361_{184}	136
137	2.6619_{702}	105.2	1123.7	1018.5	953.2	65.3	0.1936	132.5_{32}	0.007545_{187}	137
138	2.7321_{719}	106.2	1124.0	1017.8	952.4	65.4	0.1952	129.3_{31}	0.007732_{192}	138
139	2.8040_{734}	107.2	1124.3	1017.1	951.6	65.5	0.1969	126.2_{30}	0.007924_{196}	139
140	2.8774_{751}	108.2	1124.6	1016.4	950.8	65.6	0.1986	123.2_{30}	0.008120_{198}	140
141	2.9525_{767}	109.2	1124.9	1015.7	950.0	65.7	0.2003	120.2_{29}	0.008318_{204}	141
142	3.0292_{784}	110.2	1125.3	1015.1	949.3	65.8	0.2020	117.3_{28}	0.008522_{208}	142
143	3.1076_{801}	111.2	1125.6	1014.4	948.5	65.9	0.2036	114.5_{27}	0.008730_{212}	143

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int\frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
144	3.1877_{819}	112.2	1125.9	1013.7	947.7	66.0	0.2053	111.8_{26}	0.008942_{217}	144
145	3.2696_{836}	113.3	1126.2	1012.9	946.8	66.1	0.2070	109.2_{25}^{26}	0.009159_{220}	145
146	3.3532_{855}	114.3	1126.5	1012.2	946.0	66.2	0.2086	106.6_{25}^{26}	0.009379_{225}	146
147	3.4387_{873}	115.3	1126.8	1011.5	945.2	66.3	0.2103	104.1_{24}	0.009604_{220}	147
148	3.5260_{892}	116.3	1127.1	1010.8	944.4	66.4	0.2119	101.7_{24}	0.009833_{237}	148
149	3.6152_{911}	117.3	1127.4	1010.1	943.6	66.5	0.2136	99.33_{230}^{24}	0.01007_{24}	149
150	3.7063_{930}	118.3	1127.7	1009.4	942.8	66.6	0.2152	97.03_{224}	0.01031_{24}	150
151	3.7993_{950}	119.3	1128.0	1008.7	942.0	66.7	0.2169	94.79_{218}	0.01055_{25}	151
152	3.8943_{970}	120.3	1128.3	1008.0	941.3	66.7	0.2185	92.61_{212}^{218}	0.01080_{25}	152
153	3.9913_{990}	121.3	1128.6	1007.3	940.5	66.8	0.2202	90.49_{206}^{212}	0.01105_{26}	153
154	4.0903_{1011}	122.3	1128.9	1006.6	939.7	66.9	0.2218	88.43_{201}	0.01131_{26}	154
155	4.1914_{1032}	123.3	1129.2	1005.9	938.9	67.0	0.2235	86.42_{195}^{201}	0.01157_{27}	155
156	4.2946_{1054}	124.3	1129.5	1005.2	938.1	67.1	0.2251	84.47_{191}^{195}	0.01184_{27}	156
157	4.4000_{1075}	125.4	1129.8	1004.4	937.2	67.2	0.2267	82.56_{186}	0.01211_{28}	157
158	4.5075_{1097}	126.4	1130.1	1003.7	936.4	67.3	0.2284	80.70_{180}^{186}	0.01239_{28}	158
159	4.6172_{1120}	127.4	1130.4	1003.0	935.6	67.4	0.2300	78.90_{176}^{180}	0.01267_{29}	159
160	4.7292_{1143}	128.4	1130.7	1002.3	934.8	67.5	0.2316	77.14_{171}	0.01296_{30}	160
161	4.8435_{1166}	129.4	1131.0	1001.6	934.0	67.6	0.2332	75.43_{166}	0.01326_{30}	161
162	4.9601_{1189}	130.4	1131.4	1001.0	933.3	67.7	0.2349	73.77_{163}^{166}	0.01356_{30}	162
163	5.079_{121}	131.4	1131.7	1000.3	932.5	67.8	0.2365	72.14_{158}^{163}	0.01386_{31}	163
164	5.200_{124}	132.4	1132.0	999.6	931.7	67.9	0.2381	70.56_{155}	0.01417_{32}	164
165	5.324_{126}	133.4	1132.3	998.9	930.9	68.0	0.2397	69.01_{150}^{155}	0.01449_{32}	165
166	5.450_{129}	134.4	1132.6	998.2	930.1	68.1	0.2413	67.51_{146}^{150}	0.01481_{33}	166
167	5.579_{131}	135.4	1132.9	997.5	929.3	68.2	0.2429	66.05_{143}	0.01514_{34}	167
168	5.710_{134}	136.4	1133.2	996.8	928.5	68.3	0.2445	64.62_{140}^{143}	0.01548_{34}	168
169	5.844_{137}	137.4	1133.5	996.1	927.7	68.4	0.2461	63.22_{137}^{140}	0.01582_{35}	169
170	5.981_{139}	138.5	1133.8	995.3	926.8	68.5	0.2477	61.85_{132}	0.01617_{35}	170
171	6.120_{142}	139.5	1134.1	994.6	926.0	68.6	0.2493	60.53_{128}	0.01652_{36}	171
172	6.262_{145}	140.5	1134.4	993.9	925.2	68.7	0.2509	59.25_{126}^{128}	0.01688_{36}	172
173	6.407_{147}	141.5	1134.7	993.2	924.4	68.8	0.2525	57.99_{123}^{126}	0.01724_{38}	173
174	6.554_{150}	142.5	1135.0	992.5	923.7	68.8	0.2541	56.76_{120}	0.01762_{38}	174
175	6.704_{154}	143.5	1135.3	991.8	922.9	68.9	0.2557	55.56_{116}^{120}	0.01800_{38}	175
176	6.858_{156}	144.5	1135.6	991.1	922.1	69.0	0.2573	54.40_{114}^{116}	0.01838_{40}	176
177	7.014_{159}	145.5	1135.9	990.4	921.3	69.1	0.2589	53.26_{112}	0.01878_{40}	177
178	7.173_{162}	146.5	1136.2	989.7	920.5	69.2	0.2604	52.14_{108}^{112}	0.01918_{40}	178
179	7.335_{165}	147.5	1136.5	989.0	919.7	69.3	0.2620	51.06_{105}^{108}	0.01958_{42}	179
180	7.500_{168}	148.5	1136.8	988.3	918.9	69.4	0.2636	50.01_{103}	0.02000_{42}	180
181	7.668_{172}	149.5	1137.1	987.6	918.1	69.5	0.2652	48.98_{101}	0.02042_{43}	181
182	7.840_{174}	150.6	1137.5	986.9	917.3	69.6	0.2667	47.97_{98}	0.02085_{43}	182
183	8.014_{178}	151.6	1137.8	986.2	916.5	69.7	0.2683	46.99_{96}	0.02128_{44}	183

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. h	Heat of Vaporization. r	Heat equivalent of Internal Work. p	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int\frac{dq}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
184	8.192_{181}	152.6	1138.1	985.5	915.7	69.8	0.2699	46.03_{94}	0.02172_{46}	184
185	8.373_{185}	153.6	1138.4	984.8	914.9	69.9	0.2714	45.09_{92}	0.02218_{46}	185
186	8.558_{188}	154.6	1138.7	984.1	914.1	70.0	0.2730	44.17_{89}	0.02264_{47}	186
187	8.746_{191}	155.6	1139.0	983.4	913.4	70.0	0.2745	43.28_{87}	0.02311_{47}	187
188	8.937_{195}	156.6	1139.3	982.7	912.6	70.1	0.2761	42.41_{85}	0.02358_{48}	188
189	9.132_{198}	157.6	1139.6	982.0	901.8	70.2	0.2777	41.56_{83}	0.02406_{49}	189
190	9.330_{202}	158.6	1139.9	981.3	911.0	70.3	0.2792	40.73_{81}	0.02455_{50}	190
191	9.532_{206}	159.6	1140.2	980.6	910.2	70.4	0.2808	39.92_{79}	0.02505_{51}	191
192	9.738_{209}	160.6	1140.5	979.9	909.4	70.5	0.2823	39.13_{78}	0.02556_{52}	192
193	9.947_{213}	161.6	1140.8	979.2	908.6	70.6	0.2838	38.35_{76}	0.02608_{52}	193
194	10.160_{217}	162.6	1141.1	978.5	907.8	70.7	0.2854	37.59_{74}	0.02660_{54}	194
195	10.377_{221}	163.7	1141.4	977.7	909.9	70.8	0.2869	36.85_{72}	0.02714_{54}	195
196	10.598_{224}	164.7	1141.7	977.0	909.2	70.8	0.2885	36.13_{71}	0.02768_{55}	196
197	10.822_{229}	165.7	1142.0	976.3	905.4	70.9	0.2900	35.42_{69}	0.02823_{56}	197
198	11.051_{232}	166.7	1142.3	975.6	904.6	71.0	0.2915	34.73_{67}	0.02879_{57}	198
199	11.283_{237}	167.7	1142.6	974.9	903.8	71.1	0.2930	34.06_{66}	0.02936_{58}	199
200	11.520_{241}	168.7	1142.9	974.2	903.0	71.2	0.2946	33.40_{64}	0.02994_{59}	200
201	11.761_{244}	169.7	1143.2	973.5	902.2	71.3	0.2961	32.76_{63}	0.03053_{59}	201
202	12.005_{249}	170.7	1143.6	972.9	901.5	71.4	0.2976	32.13_{61}	0.03112_{61}	202
203	12.254_{254}	171.7	1143.9	972.2	900.8	71.4	0.2991	31.52_{60}	0.03173_{62}	203
204	12.508_{257}	172.7	1144.2	971.5	900.0	71.5	0.3007	30.92_{59}	0.03235_{62}	204
205	12.765_{263}	173.7	1144.5	970.8	899.2	71.6	0.3022	30.33_{57}	0.03297_{66}	205
206	13.028_{266}	174.7	1144.8	970.1	898.4	71.7	0.3037	29.76_{57}	0.03361_{65}	206
207	13.294_{271}	175.8	1145.1	969.3	897.5	71.8	0.3052	29.19_{56}	0.03426_{67}	207
208	13.565_{276}	176.8	1145.4	968.6	896.7	71.9	0.3067	28.63_{54}	0.03493_{67}	208
209	13.841_{281}	177.8	1145.7	967.9	896.0	71.9	0.3082	28.09_{52}	0.03560_{68}	209
210	14.122_{285}	178.8	1146.0	967.2	895.2	72.0	0.3097	27.57_{52}	0.03628_{69}	210
211	14.407_{290}	179.8	1146.3	966.5	894.4	72.1	0.3112	27.05_{45}	0.03697_{63}	211
212	14.697_{293}	180.8	1146.6	965.8	893.5	72.3	0.3127	26.60_{44}	0.03760_{64}	212
213	14.990_{299}	181.8	1146.9	965.1	892.6	72.5	0.3142	26.16_{49}	0.03824_{72}	213
214	15.289_{303}	182.8	1147.2	964.4	891.8	72.6	0.3157	25.67_{48}	0.03896_{73}	214
215	15.592_{309}	183.8	1147.5	963.7	891.0	72.7	0.3172	25.19_{46}	0.03969_{74}	215
216	15.901_{313}	184.8	1147.8	963.0	890.2	72.8	0.3187	24.73_{45}	0.04043_{75}	216
217	16.214_{319}	185.8	1148.1	962.3	889.5	72.8	0.3202	24.28_{44}	0.04118_{76}	217
218	16.533_{324}	186.8	1148.4	961.6	888.7	72.9	0.3217	23.84_{43}	0.04194_{78}	218
219	16.857_{329}	187.8	1148.7	960.9	887.9	73.0	0.3232	23.41_{43}	0.04272_{80}	219
220	17.186_{335}	188.9	1149.0	960.1	887.1	73.0	0.3246	22.98_{42}	0.04352_{80}	220
221	17.521_{340}	189.9	1149.3	959.4	886.3	73.1	0.3261	22.56_{41}	0.04432_{82}	221
222	17.861_{345}	190.9	1149.7	958.8	885.6	73.2	0.3276	22.15_{39}	0.04514_{82}	222
223	18.206_{351}	191.9	1150.0	958.1	884.8	73.3	0.3291	21.76_{39}	0.04596_{84}	223

SATURATED STEAM — *Continued.*

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{dt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
224	18.557_{357}	192.9	1150.3	957.4	884.0	73.4	0.3305	21.37_{38}	0.04679_{85}	224
225	18.914_{362}	193.9	1150.6	956.7	883.3	73.4	0.3320	20.99_{38}	0.04764_{86}	225
226	19.276_{368}	194.9	1150.9	956.0	882.5	73.5	0.3335	20.62_{37}	0.04850_{88}	226
227	19.644_{374}	195.9	1151.2	955.3	881.7	73.6	0.3349	20.25_{36}	0.04938_{90}	227
228	20.018_{379}	196.9	1151.5	954.6	880.9	73.7	0.3364	19.89_{35}	0.05028_{90}	228
229	20.397_{386}	197.9	1151.8	953.9	880.2	73.7	0.3379	19.54_{34}	0.05118_{90}	229
230	20.783_{392}	198.9	1152.1	953.2	879.4	73.8	0.3393	19.20_{33}	0.05208_{92}	230
231	21.175_{397}	199.9	1152.4	952.5	878.6	73.9	0.3408	18.87_{33}	0.05300_{94}	231
232	21.572_{404}	201.0	1152.7	951.7	877.8	73.9	0.3423	18.54_{32}	0.05394_{95}	232
233	21.976_{410}	202.0	1153.0	951.0	877.0	74.0	0.3437	18.22_{32}	0.05489_{97}	233
234	22.386_{417}	203.0	1153.3	950.3	876.2	74.1	0.3452	17.90_{31}	0.05586_{99}	234
235	22.803_{423}	204.0	1153.6	949.6	875.4	74.2	0.3466	17.59_{30}	0.05685_{99}	235
236	23.226_{429}	205.0	1153.9	948.9	874.6	74.3	0.3481	17.29_{30}	0.05784_{101}	236
237	23.655_{436}	206.0	1154.2	948.2	873.9	74.3	0.3495	16.99_{29}	0.05885_{102}	237
238	24.091_{442}	207.0	1154.5	947.5	873.1	74.4	0.3510	16.70_{28}	0.05987_{103}	238
239	24.533_{449}	208.0	1154.8	946.8	872.3	74.5	0.3524	16.42_{28}	0.06090_{105}	239
240	24.982_{456}	209.0	1155.1	946.1	871.6	74.5	0.3538	16.14_{27}	0.06195_{106}	240
241	25.438_{462}	210.0	1155.4	945.4	870.8	74.6	0.3553	15.87_{27}	0.06301_{108}	241
242	25.900_{470}	211.0	1155.8	944.8	870.1	74.7	0.3567	15.60_{26}	0.06409_{110}	242
243	26.370_{476}	212.0	1156.1	944.1	869.3	74.8	0.3581	15.34_{26}	0.06519_{111}	243
244	26.846_{484}	213.0	1156.4	943.4	868.5	74.9	0.3596	15.08_{25}	0.06630_{113}	244
245	27.330_{491}	214.1	1156.7	942.6	867.7	74.9	0.3610	14.83_{25}	0.06743_{115}	245
246	27.821_{498}	215.1	1157.0	941.9	866.9	75.0	0.3624	14.58_{24}	0.06858_{115}	246
247	28.319_{505}	216.1	1157.3	941.2	866.1	75.1	0.3639	14.34_{23}	0.06973_{116}	247
248	28.824_{512}	217.1	1157.6	940.5	865.3	75.2	0.3653	14.11_{23}	0.07089_{118}	248
249	29.336_{520}	218.1	1157.9	939.8	864.5	75.3	0.3667	13.88_{23}	0.07207_{120}	249
250	29.856_{528}	219.1	1158.2	939.1	863.8	75.3	0.3681	13.65_{22}	0.07327_{121}	250
251	30.384_{535}	220.1	1158.5	938.4	863.0	75.4	0.3695	13.43_{22}	0.07448_{123}	251
252	30.919_{543}	221.1	1158.8	937.7	862.2	75.5	0.3709	13.21_{22}	0.07571_{126}	252
253	31.462_{550}	222.1	1159.1	937.0	861.4	75.6	0.3724	12.99_{21}	0.07697_{128}	253
254	32.012_{559}	223.1	1159.4	936.3	860.7	75.6	0.3738	12.78_{21}	0.07825_{128}	254
255	32.571_{566}	224.1	1159.7	935.6	859.9	75.7	0.3752	12.57_{20}	0.07953_{129}	255
256	33.137_{574}	225.1	1160.0	934.9	859.1	75.8	0.3766	12.37_{20}	0.08082_{132}	256
257	33.711_{583}	226.2	1160.3	934.1	858.2	75.9	0.3780	12.17_{19}	0.08214_{133}	257
258	34.294_{590}	227.2	1160.6	933.4	857.5	75.9	0.3794	11.98_{19}	0.08347_{135}	258
259	34.884_{599}	228.2	1160.9	932.7	856.7	76.0	0.3808	11.79_{19}	0.08482_{137}	259
260	35.483_{607}	229.2	1161.2	932.0	855.9	76.1	0.3822	11.60_{18}	0.08619_{138}	260
261	36.090_{616}	230.2	1161.5	931.3	855.1	76.2	0.3836	11.42_{18}	0.08757_{140}	261
262	36.706_{624}	231.2	1161.9	930.7	854.4	76.3	0.3850	11.24_{18}	0.08897_{142}	262
263	37.330_{633}	232.2	1162.2	930.0	853.7	76.3	0.3864	11.06_{17}	0.09039_{143}	263

SATURATED STEAM—*Continued.*

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int\frac{dt}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
264	37.963_{641}	233.2	1162.5	929.3	852.9	76.4	0.3878	10.80_{17}	0.09182_{145}	264
265	38.604_{651}	234.2	1162.8	928.6	852.1	76.5	0.3891	10.72_{17}	0.09327_{147}	265
266	39.255_{659}	235.2	1163.1	927.9	851.3	76.6	0.3906	10.55_{16}	0.09474_{150}	266
267	39.914_{668}	236.2	1163.4	927.2	850.6	76.6	0.3919	10.39_{16}	0.09624_{151}	267
268	40.582_{677}	237.2	1163.7	926.5	849.8	76.7	0.3933	10.23_{16}	0.09775_{152}	268
269	41.259_{686}	238.2	1164.0	925.8	849.0	76.8	0.3947	10.07_{15}	0.09927_{153}	269
270	41.945_{695}	239.3	1164.3	925.0	848.1	76.9	0.3961	9.918_{152}	0.1008_{16}	270
271	42.640_{705}	240.3	1164.6	924.3	847.4	76.9	0.3975	9.766_{149}	0.1024_{16}	271
272	43.345_{714}	241.3	1164.9	923.6	846.6	77.0	0.3988	9.617_{146}	0.1040_{16}	272
273	44.059_{723}	242.3	1165.2	922.9	845.8	77.1	0.4002	9.471_{143}	0.1056_{16}	273
274	44.782_{733}	243.3	1165.5	922.2	845.0	77.2	0.4016	9.328_{141}	0.1072_{16}	274
275	45.515_{743}	244.3	1165.8	921.5	844.2	77.3	0.4030	9.187_{138}	0.1088_{17}	275
276	46.258_{753}	245.3	1166.1	920.8	843.5	77.3	0.4043	9.049_{136}	0.1105_{17}	276
277	47.011_{762}	246.3	1166.4	920.1	842.7	77.4	0.4057	8.913_{133}	0.1122_{17}	277
278	47.773_{772}	247.3	1166.7	919.4	841.9	77.5	0.4071	8.780_{131}	0.1139_{17}	278
279	48.545_{783}	248.3	1167.0	918.7	841.1	77.6	0.4084	8.649_{128}	0.1156_{17}	279
280	49.328_{792}	249.3	1167.3	918.0	840.4	77.6	0.4098	8.521_{126}	0.1173_{18}	280
281	50.12_{80}	250.3	1167.6	917.3	839.6	77.7	0.4112	8.395_{124}	0.1191_{18}	281
282	50.92_{82}	251.4	1168.0	916.6	838.8	77.8	0.4125	8.271_{122}	0.1209_{18}	282
283	51.74_{82}	252.4	1168.3	915.9	838.0	77.9	0.4139	8.149_{119}	0.1227_{18}	283
284	52.56_{83}	253.4	1168.6	915.2	837.2	78.0	0.4152	8.030_{117}	0.1245_{19}	284
285	53.39_{85}	254.4	1168.9	914.5	836.5	78.0	0.4166	7.913_{116}	0.1264_{19}	285
286	54.24_{85}	255.4	1169.2	913.8	835.7	78.1	0.4179	7.797_{113}	0.1283_{19}	286
287	55.09_{87}	256.4	1169.5	913.1	834.9	78.2	0.4193	7.684_{111}	0.1302_{19}	287
288	55.96_{87}	257.4	1169.8	912.4	834.1	78.3	0.4206	7.573_{109}	0.1321_{19}	288
289	56.83_{89}	258.4	1170.1	911.7	833.4	78.3	0.4220	7.464_{108}	0.1340_{19}	289
290	57.72_{90}	259.4	1170.4	911.0	832.6	78.4	0.4233	7.356_{105}	0.1359_{20}	290
291	58.62_{91}	260.4	1170.7	910.3	831.8	78.5	0.4247	7.251_{103}	0.1379_{20}	291
292	59.53_{92}	261.4	1171.0	909.6	831.0	78.6	0.4260	7.148_{102}	0.1399_{20}	292
293	60.45_{93}	262.4	1171.3	908.9	830.3	78.6	0.4273	7.046_{100}	0.1419_{21}	293
294	61.38_{95}	263.4	1171.6	908.2	829.5	78.7	0.4287	6.946_{99}	0.1440_{21}	294
295	62.33_{95}	264.5	1171.9	907.4	828.6	78.8	0.4300	6.847_{97}	0.1461_{21}	295
296	63.28_{97}	265.5	1172.2	906.7	827.8	78.9	0.4313	6.750_{95}	0.1482_{21}	296
297	64.25_{98}	266.5	1172.5	906.0	827.0	79.0	0.4327	6.655_{93}	0.1503_{21}	297
298	65.23_{99}	267.5	1172.8	905.3	826.3	79.0	0.4340	6.562_{92}	0.1524_{21}	298
299	66.22_{100}	268.5	1173.1	904.6	825.5	79.1	0.4353	6.470_{90}	0.1545_{22}	299
300	67.22_{102}	269.5	1173.4	903.9	824.7	79.2	0.4366	6.380_{88}	0.1567_{22}	300
301	68.24_{103}	270.5	1173.7	903.2	823.9	79.3	0.4380	6.292_{87}	0.1589_{22}	301
302	69.27_{103}	271.5	1174.1	902.6	823.3	79.3	0.4393	6.205_{86}	0.1611_{23}	302
303	70.30_{106}	272.5	1174.4	901.9	822.5	79.4	0.4406	6.119_{84}	0.1634_{23}	303

SATURATED STEAM — *Continued.*

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\nu$	Entropy of the Liquid. $\int\frac{dt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
304	71.36_{106}	273.5	1174.7	901.2	821.7	79.5	0.4419	6.035_{83}	0.1657_{23}	304
305	72.42_{108}	274.5	1175.0	900.5	820.9	79.6	0.4433	5.952_{81}	0.1680_{23}	305
306	73.50_{109}	275.5	1175.3	899.8	820.1	79.7	0.4446	5.871_{80}	0.1703_{24}	306
307	74.59_{110}	276.6	1175.6	899.0	819.3	79.7	0.4459	5.791_{79}	0.1727_{24}	307
308	75.69_{111}	277.6	1175.9	898.3	818.5	79.8	0.4472	5.712_{78}	0.1751_{24}	308
309	76.80_{113}	278.6	1176.2	897.6	817.7	79.9	0.4485	5.634_{76}	0.1775_{24}	309
310	77.93_{114}	279.6	1176.5	896.9	817.0	79.9	0.4498	5.558_{74}	0.1799_{24}	310
311	79.07_{116}	280.6	1176.8	896.2	816.2	80.0	0.4511	5.484_{74}	0.1823_{25}	311
312	80.23_{116}	281.6	1177.1	895.5	815.4	80.1	0.4524	5.410_{73}	0.1848_{25}	312
313	81.39_{118}	282.7	1177.4	894.7	814.5	80.2	0.4538	5.337_{71}	0.1873_{26}	313
314	82.57_{120}	283.7	1177.7	894.0	813.8	80.2	0.4552	5.266_{71}	0.1899_{26}	314
315	83.77_{121}	284.8	1178.0	893.2	812.9	80.3	0.4565	5.195_{69}	0.1925_{26}	315
316	84.98_{122}	285.8	1178.3	892.5	812.1	80.4	0.4579	5.126_{68}	0.1951_{26}	316
317	86.20_{123}	286.9	1178.6	891.7	811.3	80.4	0.4592	5.058_{67}	0.1977_{27}	317
318	87.43_{125}	287.9	1178.9	891.0	810.5	80.5	0.4606	4.991_{66}	0.2004_{27}	318
319	88.68_{127}	289.0	1179.2	890.2	809.6	80.6	0.4619	4.925_{64}	0.2031_{27}	319
320	89.95_{128}	290.0	1179.5	889.5	808.8	80.7	0.4633	4.861_{64}	0.2058_{27}	320
321	91.23_{129}	291.0	1179.8	888.8	808.1	80.7	0.4646	4.797_{62}	0.2085_{27}	321
322	92.52_{130}	292.1	1180.2	888.1	807.3	80.8	0.4659	4.735_{62}	0.2112_{28}	322
323	93.82_{132}	293.1	1180.5	887.4	806.5	80.9	0.4672	4.673_{61}	0.2140_{28}	323
324	95.14_{134}	294.2	1180.8	886.6	805.7	80.9	0.4686	4.612_{60}	0.2168_{29}	324
325	96.48_{135}	295.2	1181.1	885.9	804.9	81.0	0.4699	4.552_{59}	0.2197_{29}	325
326	97.83_{137}	296.3	1181.4	885.1	804.1	81.1	0.4713	4.493_{57}	0.2226_{29}	326
327	99.20_{138}	297.3	1181.7	884.4	803.3	81.1	0.4726	4.436_{57}	0.2255_{29}	327
328	100.58_{139}	298.4	1182.0	883.6	802.4	81.2	0.4739	4.379_{56}	0.2284_{29}	328
329	101.97_{141}	299.4	1182.3	882.9	801.6	81.3	0.4752	4.323_{56}	0.2313_{30}	329
330	103.38_{143}	300.5	1182.6	882.1	800.8	81.3	0.4766	4.267_{54}	0.2343_{31}	330
331	104.81_{144}	301.5	1182.9	881.4	800.0	81.4	0.4779	4.213_{54}	0.2374_{30}	331
332	106.25_{145}	302.6	1183.2	880.6	799.1	81.5	0.4792	4.159_{52}	0.2404_{31}	332
333	107.70_{147}	303.6	1183.5	879.9	798.4	81.5	0.4805	4.107_{52}	0.2435_{31}	333
334	109.17_{149}	304.6	1183.8	879.2	797.6	81.6	0.4818	4.055_{51}	0.2466_{32}	334
335	110.66_{151}	305.7	1184.1	878.4	796.7	81.7	0.4832	4.004_{50}	0.2498_{31}	335
336	112.17_{152}	306.7	1184.4	877.7	796.0	81.7	0.4845	3.954_{50}	0.2529_{32}	336
337	113.69_{153}	307.8	1184.7	876.9	795.1	81.8	0.4858	3.904_{49}	0.2561_{33}	337
338	115.22_{155}	308.8	1185.0	876.2	794.3	81.9	0.4871	3.855_{48}	0.2594_{33}	338
339	116.77_{157}	309.9	1185.3	875.4	793.5	81.9	0.4884	3.807_{47}	0.2627_{33}	339
340	118.34_{159}	310.9	1185.6	874.7	792.7	82.0	0.4897	3.760_{47}	0.2660_{33}	340
341	119.93_{160}	312.0	1185.9	873.9	791.8	82.1	0.4910	3.713_{45}	0.2693_{33}	341
342	121.53_{162}	313.0	1186.3	873.3	791.2	82.1	0.4923	3.668_{45}	0.2726_{34}	342
343	123.15_{163}	314.1	1186.6	872.5	790.3	82.2	0.4936	8.623_{45}	0.2760_{35}	343

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int\frac{dq}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
344	124.78_{165}	315.1	1186.9	871.8	789.5	82.3	0.4949	3.578_{44}	0.2795_{35}	344
345	126.43_{167}	316.1	1187.2	871.1	788.8	82.3	0.4962	3.534_{43}	0.2830_{35}	345
346	128.10_{169}	317.2	1187.5	870.3	787.9	82.4	0.4975	3.491_{42}	0.2865_{35}	346
347	129.79_{170}	318.2	1187.8	869.6	787.1	82.5	0.4988	3.449_{42}	0.2900_{35}	347
348	131.49_{172}	319.3	1188.1	868.8	786.3	82.5	0.5001	3.407_{42}	0.2935_{36}	348
349	133.21_{174}	320.3	1188.4	868.1	785.5	82.6	0.5014	3.365_{41}	0.2971_{37}	349
350	134.95_{176}	321.4	1188.7	867.3	784.7	82.6	0.5027	3.324_{40}	0.3008_{37}	350
351	136.71_{177}	322.4	1189.0	866.6	783.9	82.7	0.5040	3.284_{39}	0.3045_{37}	351
352	138.48_{179}	323.5	1189.3	865.8	783.0	82.8	0.5053	3.245_{39}	0.3082_{37}	352
353	140.27_{181}	324.5	1189.6	865.1	782.3	82.8	0.5066	3.206_{38}	0.3119_{38}	353
354	142.08_{183}	325.6	1189.9	864.3	781.4	82.9	0.5078	3.168_{38}	0.3157_{38}	354
355	143.91_{184}	326.6	1190.2	863.6	780.7	82.9	0.5091	3.130_{38}	0.3195_{39}	355
356	145.75_{187}	327.7	1190.5	862.8	779.8	83.0	0.5104	3.092_{36}	0.3234_{38}	356
357	147.62_{188}	328.7	1190.8	862.1	779.0	83.1	0.5117	3.056_{36}	0.3272_{39}	357
358	149.50_{190}	329.7	1191.1	861.4	778.3	83.1	0.5130	3.020_{36}	0.3311_{40}	358
359	151.40_{193}	330.8	1191.4	860.6	777.4	83.2	0.5142	2.984_{35}	0.3351_{40}	359
360	153.33_{194}	331.8	1191.7	859.9	776.7	83.2	0.5155	2.949_{35}	0.3391_{40}	360
361	155.27_{195}	332.9	1192.0	859.1	775.8	83.3	0.5168	2.914_{34}	0.3431_{41}	361
362	157.22_{198}	333.9	1192.4	858.5	775.2	83.3	0.5181	2.880_{34}	0.3472_{41}	362
363	159.20_{200}	335.0	1192.7	857.7	774.3	83.4	0.5193	2.846_{33}	0.3513_{42}	363
364	161.20_{202}	336.0	1193.0	857.0	773.5	83.5	0.5206	2.813_{33}	0.3555_{42}	364
365	163.22_{203}	337.1	1193.3	856.2	772.7	83.5	0.5219	2.780_{32}	0.3597_{42}	365
366	165.25_{206}	338.1	1193.6	855.5	771.9	83.6	0.5231	2.748_{32}	0.3639_{43}	366
367	167.31_{208}	339.2	1193.9	854.7	771.1	83.6	0.5244	2.716_{31}	0.3682_{43}	367
368	169.39_{209}	340.2	1194.2	854.0	770.4	83.6	0.5257	2.685_{31}	0.3725_{43}	368
369	171.48_{212}	341.3	1194.5	853.2	769.5	83.7	0.5269	2.654_{31}	0.3768_{44}	369
370	173.60_{214}	342.3	1194.8	852.5	768.7	83.8	0.5282	2.623_{30}	0.3812_{44}	370
371	175.74_{215}	343.3	1195.1	851.8	768.0	83.8	0.5294	2.593_{30}	0.3856_{45}	371
372	177.89_{218}	344.4	1195.4	851.0	767.1	83.9	0.5307	2.563_{29}	0.3901_{45}	372
373	180.07_{220}	345.5	1195.7	850.2	766.3	83.9	0.5320	2.534_{29}	0.3946_{46}	373
374	182.27_{222}	346.5	1196.0	849.5	765.5	84.0	0.5332	2.505_{29}	0.3992_{46}	374
375	184.49_{224}	347.5	1196.3	848.8	764.8	84.0	0.5345	2.476_{28}	0.4038_{46}	375
376	186.73_{226}	348.6	1196.6	848.0	763.9	84.1	0.5357	2.448_{28}	0.4084_{47}	376
377	188.99_{228}	349.6	1196.9	847.3	763.2	84.1	0.5370	2.420_{27}	0.4131_{47}	377
378	191.27_{231}	350.6	1197.2	846.6	762.4	84.2	0.5382	2.393_{27}	0.4178_{49}	378
379	193.58_{233}	351.7	1197.5	845.8	761.6	84.2	0.5395	2.366_{26}	0.4227_{49}	379
380	195.91_{234}	352.8	1197.8	845.0	760.8	84.2	0.5407	2.338_{25}	0.4276_{47}	380
381	198.25_{237}	353.8	1198.1	844.3	760.0	84.3	0.5420	2.313_{26}	0.4323_{49}	381
382	200.62_{239}	354.9	1198.5	843.6	759.3	84.3	0.5432	2.287_{25}	0.4372_{49}	382
383	203.01_{242}	355.9	1198.8	842.9	758.5	84.4	0.5444	2.262_{25}	0.4421_{49}	383

SATURATED STEAM — *Continued.*

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\mu$	Entropy of the Liquid. $\int\frac{cdt}{T}$	Specific Volume. s	Density. Weight, In Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
384	205.43_{244}	356.9	1199.1	842.2	757.8	84.4	0.5457	2.237_{25}	0.4470_{51}	384
385	207.87^{246}_{244}	358.0	1199.4	841.4	756.9	84.5	0.5469	2.212_{25}	0.4521_{51}	385
386	210.33^{248}_{246}	359.0	1199.7	840.7	756.2	84.5	0.5481	2.187_{24}	0.4572^{51}_{51}	386
387	212.81_{250}	360.1	1200.0	839.9	755.3	84.6	0.5494	2.163_{24}	0.4623_{52}	387
388	215.31^{253}_{250}	361.1	1200.3	839.2	754.6	84.6	0.5506	2.139_{24}	0.4675^{53}_{52}	388
389	217.84^{255}_{253}	362.2	1200.6	838.4	753.8	84.6	0.5518	2.115_{23}	0.4728^{53}_{52}	389
390	220.39^{257}_{255}	363.2	1200.9	837.7	753.0	84.7	0.5531	2.092_{23}	0.4780_{53}	390
391	222.96^{260}_{257}	364.3	1201.2	836.9	752.2	84.7	0.5543	2.069_{23}	0.4833_{54}	391
392	225.56^{263}_{260}	365.3	1201.5	836.2	751.4	84.8	0.5555	2.046^{22}_{22}	0.4887^{54}_{54}	392
393	228.19^{265}_{263}	366.4	1201.8	835.4	750.6	84.8	0.5568	2.024^{22}_{22}	0.4941^{54}_{55}	393
394	230.83^{267}_{265}	367.4	1202.1	834.7	749.9	84.8	0.5580	2.002^{22}_{22}	0.4996_{55}	394
395	233.50^{269}_{267}	368.4	1202.4	834.0	749.1	84.9	0.5592	1.980^{22}_{21}	0.5051^{56}_{55}	395
396	236.19^{272}_{269}	369.5	1202.7	833.2	748.3	84.9	0.5604	1.958^{21}_{21}	0.5107^{56}_{56}	396
397	238.91^{274}_{272}	370.5	1203.0	832.5	747.6	84.9	0.5616	1.937_{21}	0.5163_{56}	397
398	241.65^{277}_{274}	371.6	1203.3	831.7	746.7	85.0	0.5629	1.916^{21}_{21}	0.5219^{58}_{56}	398
399	244.42^{277}_{279}	372.6	1203.6	831.0	746.0	85.0	0.5641	1.895^{21}_{21}	0.5277^{58}_{59}	399
400	247.21_{282}	373.7	1203.9	830.2	745.2	85.0	0.5653	1.874_{20}	0.5336_{58}	400
401	250.03_{284}	374.7	1204.2	829.5	744.5	85.0	0.5665	1.854_{20}	0.5394_{58}	401
402	252.87^{287}_{284}	375.8	1204.6	828.8	743.7	85.1	0.5677	1.834^{20}_{20}	0.5452^{60}_{58}	402
403	255.74^{287}_{289}	376.8	1204.9	828.1	743.0	85.1	0.5689	1.814^{20}_{20}	0.5512^{60}_{60}	403
404	258.63_{292}	377.9	1205.2	827.3	742.2	85.1	0.5701	1.794_{19}	0.5572_{61}	404
405	261.55^{295}_{292}	378.9	1205.5	826.6	741.4	85.2	0.5714	1.775^{19}_{19}	0.5633^{62}_{61}	405
406	264.50^{295}_{297}	380.0	1205.8	825.8	740.6	85.2	0.5726	1.756^{19}_{19}	0.5695^{62}_{61}	406
407	267.47_{300}	381.0	1206.1	825.1	739.9	85.2	0.5738	1.737_{18}	0.5756_{62}	407
408	270.47^{302}_{300}	382.0	1206.4	824.4	739.2	85.2	0.5741	1.719^{19}_{18}	0.5818^{63}_{62}	408
409	273.49^{305}_{302}	383.1	1206.7	823.6	738.3	85.3	0.5762	1.700^{18}_{18}	0.5881^{64}_{63}	409
410	276.54_{308}	384.1	1207.0	822.9	737.6	85.3	0.5774	1.682_{18}	0.5945_{65}	410
411	270.62_{311}	385.2	1207.3	822.1	736.8	85.3	0.5786	1.664_{18}	0.601_{6}	411
412	282.73^{313}_{311}	386.2	1207.6	821.4	736.1	85.3	0.5798	1.646^{17}_{18}	0.607^{7}_{6}	412
413	285.86^{316}_{313}	387.3	1207.9	820.6	735.3	85.3	0.5810	1.629^{17}_{17}	0.614^{7}_{6}	413
414	289.02_{319}	388.3	1208.2	819.9	734.5	85.4	0.5822	1.612_{17}	0.620_{7}	414
415	292.21^{321}_{319}	389.4	1208.5	819.1	733.7	85.4	0.5834	1.595^{17}_{17}	0.627^{7}_{7}	415
416	295.42^{321}_{325}	390.4	1208.8	818.4	733.0	85.4	0.5846	1.578^{17}_{17}	0.634^{7}_{7}	416
417	298.67_{327}	391.5	1209.1	817.6	732.2	85.4	0.5858	1.561_{16}	0.641_{6}	417
418	301.94^{330}_{327}	392.5	1209.4	816.9	731.5	85.4	0.5870	1.545^{17}_{16}	0.647^{7}_{7}	418
419	305.24^{330}_{333}	393.6	1209.7	816.1	730.7	85.4	0.5881	1.528^{16}_{16}	0.654^{7}_{7}	419
420	308.57_{336}	394.6	1210.0	815.4	730.0	85.4	0.5893	1.512_{16}	0.661_{7}	420
421	311.93_{338}	395.6	1210.3	814.7	729.3	85.4	0.5905	1.496_{16}	0.668_{8}	421
422	315.31^{342}_{338}	396.7	1210.7	814.0	728.5	85.5	0.5917	1.480^{15}_{16}	0.676^{7}_{8}	422
423	318.73^{342}_{345}	397.7	1211.0	813.3	727.8	85.5	0.5929	1.465^{16}_{16}	0.683^{7}_{7}	423

SATURATED STEAM — *Continued.*

Temperature, Degrees Fahr. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int \frac{dt}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot. γ	Temperature, Degrees Fahr. t
424	322.18 ^{347}	398.8	1211.3	812.5	727.0	85.5	0.5041	1.440 ^{15}	0.690 ^{7}	424
425	325.63 ^{351}	399.8	1211.6	811.8	726.3	85.5	0.5053	1.434 ^{15}	0.697 ^{8}	425
426	329.16 ^{354}	400.9	1211.9	811.0	725.5	85.5	0.5064	1.419 ^{15}	0.706 ^{7}	426
427	332.70 ^{356}	401.9	1212.2	810.3	724.8	85.5	0.5076	1.404 ^{14}	0.712 ^{7}	427
428	336.29	403.0	1212.5	809.5	724.0	85.5	0.5088	1.390	0.719	428

TABLE II.

SATURATED STEAM.

ENGLISH UNITS.

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int\frac{cdt}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
1	101.99_{2428}	70.0	1113.1	1043.0	981.1	61.9	0.1329	$334.6_{161.0}$	0.00299_{277}	1
2	126.27_{1535}	94.4	1120.5	1026.1	961.9	64.2	0.1754	$173.6_{55.2}$	0.00576_{268}	2
3	141.62_{1147}	109.8	1125.1	1015.3	949.5	65.8	0.2013	$118.4_{28.1}$	0.00844_{263}	3
4	153.09_{925}	121.4	1128.6	1007.2	940.4	66.8	0.2203	$90.31_{17.09}$	0.01107_{259}	4
5	162.34_{780}	130.7	1131.5	1000.8	933.1	67.7	0.2353	$73.22_{11.55}$	0.01366_{256}	5
6	170.14_{676}	138.6	1133.8	995.2	926.7	68.5	0.2480	$61.67_{8.30}$	0.01622_{252}	6
7	176.90_{602}	145.4	1135.9	990.5	921.4	69.1	0.2587	$53.37_{6.30}$	0.01874_{251}	7
8	182.92_{541}	151.5	1137.7	986.2	916.5	69.7	0.2682	$47.07_{4.94}$	0.02125_{249}	8
9	188.33_{492}	156.9	1139.4	982.5	912.4	70.1	0.2766	$42.13_{3.97}$	0.02374_{247}	9
10	193.25_{453}	161.9	1140.9	979.0	908.4	70.6	0.2842	$38.16_{3.28}$	0.02621_{245}	10
11	197.78_{420}	166.5	1142.3	975.8	904.8	71.0	0.2912	$34.88_{2.74}$	0.02866_{245}	11
12	201.98_{391}	170.7	1143.6	972.9	901.5	71.4	0.2976	$32.14_{2.32}$	0.03111_{244}	12
13	205.89_{368}	174.6	1144.7	970.1	898.4	71.7	0.3035	$29.82_{2.03}$	0.03355_{245}	13
14	209.57_{346}	178.3	1145.8	967.5	895.5	72.0	0.3091	$27.79_{1.64}$	0.03600_{226}	14
15	213.03_{329}	181.8	1146.9	965.1	892.6	72.5	0.3143	$26.15_{1.56}$	0.03826_{241}	15
16	216.32_{312}	185.1	1147.9	962.8	890.0	72.8	0.3192	$24.59_{1.37}$	0.04067_{240}	16
17	219.44_{296}	188.3	1148.9	960.6	887.6	73.0	0.3238	$23.22_{1.22}$	0.04307_{240}	17
18	222.40_{284}	191.3	1149.8	958.5	885.3	73.2	0.3282	$22.00_{1.10}$	0.04547_{239}	18
19	225.24_{271}	194.1	1150.7	956.6	883.2	73.4	0.3324	$20.90_{0.99}$	0.04786_{237}	19
20	227.95_{260}	196.9	1151.5	954.6	881.0	73.6	0.3363	19.91_{90}	0.05023_{236}	20
21	230.55_{251}	199.5	1152.3	952.8	879.0	73.8	0.3401	19.01_{81}	0.05259_{236}	21
22	233.06_{241}	202.0	1153.0	951.0	877.0	74.0	0.3438	18.20_{75}	0.05495_{236}	22
23	235.47_{232}	204.5	1153.7	949.2	875.0	74.2	0.3473	17.45_{69}	0.05731_{235}	23
24	237.79_{225}	206.8	1154.4	947.6	873.2	74.4	0.3506	16.76_{63}	0.05966_{233}	24
25	240.04_{217}	209.1	1155.1	946.0	871.5	74.5	0.3539	16.13_{58}	0.06199_{233}	25
26	242.21_{211}	211.2	1155.8	944.6	869.9	74.7	0.3570	15.55_{55}	0.06432_{234}	26
27	244.32_{204}	213.4	1156.5	943.1	868.2	74.9	0.3600	15.00_{51}	0.06666_{233}	27
28	246.36_{198}	215.4	1157.1	941.7	866.7	75.0	0.3629	14.49_{46}	0.06899_{231}	28
29	248.34_{193}	217.4	1157.7	940.3	865.1	75.2	0.3657	14.03_{44}	0.07130_{230}	29
30	250.27_{188}	219.4	1158.3	938.9	863.6	75.3	0.3685	13.59_{41}	0.07360_{230}	30
31	252.15_{183}	221.3	1158.8	937.5	862.0	75.5	0.3712	13.18_{40}	0.07590_{231}	31
32	253.98_{178}	223.1	1159.4	936.3	860.7	75.6	0.3737	12.78_{37}	0.07821_{230}	32
33	255.76_{174}	224.9	1159.9	935.0	859.2	75.8	0.3762	12.41_{34}	0.08051_{229}	33

SATURATED STEAM — *Continued.*

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. h	Heat of Vaporization. r	Heat equivalent of Internal Work. p	Heat equivalent of External Work. $Ap\alpha$	Entropy of the Liquid. $\int \frac{dt}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure. Pounds per Square Inch. p
34	257.50_{169}	226.7	1160.4	933.7	857.8	75.9	0.3787	12.07_{32}	0.08280_{228}	34
35	259.19_{166}	228.4	1161.0	932.6	856.6	76.0	0.3811	11.75_{30}	0.08508_{228}	35
36	260.85_{162}	230.0	1161.5	931.5	855.3	76.2	0.3834	11.45_{29}	0.08736_{228}	36
37	262.47_{159}	231.7	1162.0	930.3	854.0	76.3	0.3856	11.16_{28}	0.08964_{227}	37
38	264.06_{155}	233.3	1162.5	929.2	852.8	76.4	0.3878	10.88_{26}	0.09191_{226}	38
39	265.61_{151}	234.8	1163.0	928.2	851.7	76.5	0.3900	10.62_{25}	0.09417_{227}	39
40	267.13_{149}	236.4	1163.4	927.0	850.3	76.7	0.3921	10.37_{24}	0.09644_{225}	40
41	268.62_{146}	237.9	1163.9	926.0	849.2	76.8	0.3942	10.13_{22}	0.09869_{221}	41
42	270.08_{143}	239.3	1164.3	925.0	848.1	76.9	0.3962	9.906_{216}	0.1009_{23}	42
43	271.51_{140}	240.8	1164.8	924.0	847.0	77.0	0.3982	9.690_{206}	0.1032_{22}	43
44	272.91_{138}	242.2	1165.2	923.0	845.9	77.1	0.4001	9.484_{197}	0.1054_{23}	44
45	274.29_{136}	243.6	1165.6	922.0	844.8	77.2	0.4020	9.287_{190}	0.1077_{22}	45
46	275.65_{134}	245.0	1166.0	921.0	843.7	77.3	0.4038	9.097_{183}	0.1099_{23}	46
47	276.99_{131}	246.3	1166.4	920.1	842.7	77.4	0.4056	8.914_{174}	0.1122_{22}	47
48	278.30_{128}	247.6	1166.8	919.2	841.7	77.5	0.4074	8.740_{167}	0.1144_{22}	48
49	279.58_{127}	248.9	1167.2	918.3	840.7	77.6	0.4092	8.573_{159}	0.1166_{22}	49
50	280.85_{125}	250.2	1167.6	917.4	839.7	77.7	0.4109	8.414_{155}	0.1188_{23}	50
51	282.10_{122}	251.5	1168.0	916.5	838.7	77.8	0.4126	8.259_{149}	0.1211_{22}	51
52	283.32_{121}	252.7	1168.4	915.7	837.8	77.9	0.4143	8.110_{142}	0.1233_{22}	52
53	284.53_{119}	253.9	1168.7	914.8	836.8	78.0	0.4160	7.968_{138}	0.1255_{22}	53
54	285.72_{117}	255.1	1169.1	914.0	835.9	78.1	0.4175	7.829_{133}	0.1277_{22}	54
55	286.89_{116}	256.3	1169.4	913.1	834.9	78.2	0.4191	7.696_{128}	0.1299_{22}	55
56	288.05_{114}	257.5	1169.8	912.3	834.0	78.3	0.4207	7.568_{125}	0.1321_{23}	56
57	289.19_{112}	258.6	1170.1	911.5	833.1	78.4	0.4222	7.443_{120}	0.1344_{22}	57
58	290.31_{111}	259.7	1170.5	910.8	832.4	78.4	0.4237	7.323_{115}	0.1366_{21}	58
59	291.42_{109}	260.8	1170.8	910.0	831.5	78.5	0.4252	7.208_{112}	0.1387_{22}	59
60	292.51_{108}	261.9	1171.2	909.3	830.7	78.6	0.4267	7.096_{109}	0.1409_{22}	60
61	293.59_{106}	263.0	1171.5	908.5	829.8	78.7	0.4281	6.987_{105}	0.1431_{22}	61
62	294.65_{105}	264.1	1171.8	907.7	828.9	78.8	0.4295	6.882_{103}	0.1453_{22}	62
63	295.70_{104}	265.2	1172.1	906.9	828.0	78.9	0.4309	6.779_{99}	0.1475_{22}	63
64	296.74_{103}	266.2	1172.4	906.2	827.3	78.9	0.4323	6.680_{97}	0.1497_{22}	64
65	297.77_{101}	267.2	1172.7	905.5	826.5	79.0	0.4337	6.583_{93}	0.1519_{22}	65
66	298.78_{99}	268.3	1173.0	904.7	825.6	79.1	0.4350	6.490_{89}	0.1541_{21}	66
67	299.77_{99}	269.3	1173.3	904.0	824.8	79.2	0.4363	6.401_{87}	0.1562_{22}	67
68	300.76_{98}	270.3	1173.6	903.3	824.1	79.2	0.4376	6.314_{85}	0.1584_{22}	68
69	301.74_{97}	271.2	1173.9	902.7	823.4	79.3	0.4389	6.229_{84}	0.1606_{22}	69
70	302.71_{93}	272.2	1174.3	902.1	822.7	79.4	0.4402	6.144_{81}	0.1628_{21}	70
71	303.66_{95}	273.2	1174.6	901.4	821.9	79.5	0.4415	6.063_{79}	0.1649_{22}	71
72	304.61_{93}	274.1	1174.9	900.8	821.3	79.5	0.4428	5.984_{76}	0.1671_{22}	72
73	305.54_{92}	275.1	1175.2	900.1	820.5	79.6	0.4440	5.908_{74}	0.1693_{21}	73

SATURATED STEAM—*Continued.*

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apw	Entropy of the Liquid. $\int\frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
74	306.46_{92}	276.0	1175.4	899.4	819.7	79.7	0.4452	5.834_{72}	0.1714_{22}	74
75	307.38_{92}^{90}	276.9	1175.7	898.8	819.1	79.7	0.4464	5.762_{72}^{71}	0.1736_{21}	75
76	308.28_{90}^{90}	277.8	1176.0	898.2	818.4	79.8	0.4476	5.691_{70}^{71}	0.1757_{22}	76
77	309.18_{88}^{88}	278.7	1176.2	897.5	817.6	79.9	0.4487	5.621_{67}	0.1779_{22}	77
78	310.06_{88}^{88}	279.6	1176.5	896.9	817.0	79.9	0.4499	5.554_{66}^{67}	0.1801_{21}^{22}	78
79	310.94_{86}^{88}	280.5	1176.8	896.3	816.3	80.0	0.4511	5.488_{63}^{66}	0.1822_{21}^{21}	79
80	311.80_{86}	281.4	1177.0	895.6	815.5	80.1	0.4522	5.425_{63}	0.1843_{22}	80
81	312.66_{85}	282.3	1177.3	895.0	814.9	80.1	0.4534	5.362_{61}	0.1865_{21}	81
82	313.51_{85}	283.2	1177.6	894.4	814.2	80.2	0.4545	5.301_{61}	0.1886_{22}	82
83	314.36_{83}	284.1	1177.8	893.7	813.4	80.3	0.4557	5.240_{58}	0.1908_{22}	83
84	315.19_{83}	285.0	1178.1	893.1	812.8	80.3	0.4568	5.182_{57}	0.1930_{21}	84
85	316.02_{82}	285.8	1178.3	892.5	812.1	80.4	0.4579	5.125_{56}	0.1951_{22}	85
86	316.84_{81}	286.7	1178.6	891.9	811.5	80.4	0.4590	5.069_{55}	0.1973_{21}	86
87	317.65_{80}	287.5	1178.8	891.3	810.8	80.5	0.4601	5.014_{53}	0.1994_{22}	87
88	318.45_{80}	288.4	1179.1	890.7	810.2	80.5	0.4612	4.961_{52}	0.2016_{21}	88
89	319.25_{79}	289.2	1179.3	890.1	809.5	80.6	0.4622	4.909_{51}	0.2037_{21}	89
90	320.04_{77}	290.0	1179.6	889.6	808.9	80.7	0.4633	4.858_{50}	0.2058_{22}	90
91	320.83_{77}	290.8	1179.8	889.0	808.3	80.7	0.4643	4.808_{48}	0.2080_{21}	91
92	321.60_{77}^{77}	291.6	1180.0	888.4	807.6	80.8	0.4653	4.760_{48}	0.2101_{21}	92
93	322.37_{77}^{77}	292.4	1180.3	887.9	807.1	80.8	0.4663	4.712_{47}	0.2122_{22}	93
94	323.14_{75}	293.2	1180.5	887.3	806.4	80.9	0.4673	4.665_{46}	0.2144_{21}	94
95	323.89_{75}^{75}	294.0	1180.7	886.7	805.8	80.9	0.4683	4.619_{45}	0.2165_{21}^{21}	95
96	324.64_{74}^{75}	294.8	1181.0	886.2	805.2	81.0	0.4693	4.574_{44}	0.2186_{22}	96
97	325.38_{74}	295.6	1181.2	885.6	804.6	81.0	0.4703	4.530_{44}	0.2208_{21}	97
98	326.12_{74}^{74}	296.4	1181.4	885.0	803.9	81.1	0.4713	4.486_{42}	0.2229_{21}^{21}	98
99	326.86_{72}^{74}	297.1	1181.6	884.5	803.4	81.1	0.4723	4.444_{41}	0.2250_{21}	99
100	327.58_{72}	297.9	1181.9	884.0	802.8	81.2	0.4733	4.403_{41}	0.2271_{22}	100
101	328.30_{72}	298.6	1182.1	883.5	802.3	81.2	0.4743	4.362_{40}	0.2293_{21}	101
102	329.02_{71}^{72}	299.4	1182.3	882.9	801.6	81.3	0.4753	4.322_{40}	0.2314_{21}^{21}	102
103	329.73_{70}^{71}	300.1	1182.5	882.4	801.1	81.3	0.4762	4.282_{38}	0.2335_{21}	103
104	330.43_{70}	300.9	1182.7	881.8	800.4	81.4	0.4771	4.244_{38}	0.2356_{22}	104
105	331.13_{70}^{70}	301.6	1182.9	881.3	799.9	81.4	0.4780	4.206_{37}^{38}	0.2378_{21}^{22}	105
106	331.83_{69}^{70}	302.3	1183.1	880.8	799.3	81.5	0.4790	4.169_{37}^{37}	0.2399_{21}	106
107	332.52_{68}	303.0	1183.4	880.4	798.9	81.5	0.4799	4.132_{36}	0.2420_{21}	107
108	333.20_{68}^{68}	303.8	1183.6	879.8	798.2	81.6	0.4808	4.096_{36}^{36}	0.2441_{21}^{21}	108
109	333.88_{68}^{68}	304.5	1183.8	879.3	797.7	81.6	0.4817	4.061_{35}^{36}	0.2462_{22}^{21}	109
110	334.56_{67}	305.2	1184.0	878.8	797.1	81.7	0.4826	4.026_{34}	0.2484_{21}	110
111	335.23_{66}	305.9	1184.2	878.3	796.6	81.7	0.4835	3.992_{33}	0.2505_{21}	111
112	335.89_{66}^{66}	306.6	1184.4	877.8	796.1	81.7	0.4843	3.959_{33}^{33}	0.2526_{21}^{21}	112
113	336.55_{65}^{66}	307.3	1184.6	877.3	795.5	81.8	0.4852	3.926_{32}^{33}	0.2547_{21}^{21}	113

SATURATED STEAM — *Continued.*

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int \frac{dH}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
114	337.20_{66}	308.0	1184.8	876.8	795.0	81.8	0.4869	3.804_{32}	0.2568_{21}	114
115	337.86_{64}	308.7	1185.0	876.3	794.4	81.9	0.4880	3.802_{31}	0.2580_{21}	115
116	338.50_{64}	309.4	1185.2	875.8	793.9	81.9	0.4877	3.831_{30}	0.2610_{21}	116
117	339.14_{64}	310.0	1185.4	875.4	793.5	81.9	0.4886	3.801_{31}	0.2631_{22}	117
118	339.78_{64}	310.7	1185.6	874.9	792.9	82.0	0.4894	3.770_{30}	0.2653_{21}	118
119	340.42_{63}	311.4	1185.8	874.4	792.4	82.0	0.4903	3.740_{29}	0.2674_{21}	119
120	341.05_{62}	312.0	1186.0	874.0	791.9	82.1	0.4911	3.711_{28}	0.2695_{20}	120
121	341.67_{62}	312.7	1186.2	873.5	791.4	82.1	0.4919	3.683_{28}	0.2715_{21}	121
122	342.29_{62}	313.3	1186.3	873.0	790.8	82.2	0.4927	3.655_{28}	0.2736_{21}	122
123	342.91_{61}	314.0	1186.5	872.5	790.3	82.2	0.4935	3.627_{28}	0.2757_{22}	123
124	343.52_{61}	314.6	1186.7	872.1	789.9	82.2	0.4943	3.599_{27}	0.2779_{21}	124
125	344.13_{60}	315.2	1186.9	871.7	789.4	82.3	0.4951	3.572_{26}	0.2800_{20}	125
126	344.73_{60}	315.9	1187.1	871.2	788.9	82.3	0.4959	3.546_{26}	0.2820_{21}	126
127	345.33_{60}	316.5	1187.3	870.8	788.4	82.4	0.4967	3.520_{26}	0.2841_{21}	127
128	345.93_{60}	317.1	1187.4	870.3	787.9	82.4	0.4974	3.494_{25}	0.2862_{21}	128
129	346.53_{59}	317.7	1187.6	869.9	787.5	82.4	0.4982	3.469_{25}	0.2883_{21}	129
130	347.12_{59}	318.4	1187.8	869.4	786.9	82.5	0.4990	3.444_{25}	0.2904_{21}	130
131	347.71_{58}	319.0	1188.0	869.0	786.5	82.5	0.4997	3.419_{24}	0.2925_{21}	131
132	348.29_{58}	319.6	1188.2	868.6	786.1	82.5	0.5005	3.395_{24}	0.2946_{21}	132
133	348.87_{58}	320.2	1188.4	868.2	785.6	82.6	0.5012	3.371_{24}	0.2967_{21}	133
134	349.45_{58}	320.8	1188.5	867.7	785.1	82.6	0.5020	3.347_{24}	0.2988_{21}	134
135	350.03_{57}	321.4	1188.7	867.3	784.7	82.6	0.5027	3.323_{23}	0.3009_{21}	135
136	350.60_{57}	322.0	1188.9	866.9	784.2	82.7	0.5035	3.300_{23}	0.3030_{21}	136
137	351.17_{56}	322.6	1189.0	866.4	783.7	82.7	0.5042	3.277_{22}	0.3051_{21}	137
138	351.73_{56}	323.2	1189.2	866.0	783.3	82.7	0.5049	3.255_{21}	0.3072_{20}	138
139	352.29_{56}	323.8	1189.4	865.6	782.8	82.8	0.5056	3.234_{22}	0.3092_{21}	139
140	352.85_{55}	324.4	1189.5	865.1	782.3	82.8	0.5064	3.212_{21}	0.3113_{21}	140
141	353.40_{55}	325.0	1189.7	864.7	781.9	82.8	0.5071	3.191_{21}	0.3134_{21}	141
142	353.95_{55}	325.6	1189.9	864.3	781.4	82.9	0.5078	3.170_{21}	0.3155_{21}	142
143	354.50_{55}	326.1	1190.1	864.0	781.1	82.9	0.5085	3.149_{21}	0.3176_{21}	143
144	355.05_{54}	326.7	1190.2	863.5	780.6	82.9	0.5092	3.128_{21}	0.3197_{21}	144
145	355.59_{54}	327.2	1190.4	863.2	780.2	83.0	0.5099	3.107_{20}	0.3218_{21}	145
146	356.13_{54}	327.8	1190.6	862.8	779.8	83.0	0.5106	3.087_{19}	0.3238_{20}	146
147	356.67_{53}	328.3	1190.7	862.4	779.4	83.0	0.5113	3.068_{19}	0.3259_{21}	147
148	357.20_{53}	328.9	1190.9	862.0	778.9	83.1	0.5119	3.049_{19}	0.3280_{20}	148
149	357.73_{53}	329.4	1191.0	861.6	778.5	83.1	0.5126	3.030_{19}	0.3300_{21}	149
150	358.26_{52}	330.0	1191.2	861.2	778.1	83.1	0.5133	3.011_{19}	0.3321_{21}	150
151	358.78_{52}	330.5	1191.4	860.9	777.7	83.2	0.5140	2.992_{19}	0.3342_{21}	151
152	359.30_{52}	331.1	1191.5	860.4	777.2	83.2	0.5146	2.973_{18}	0.3363_{21}	152
153	359.82_{52}	331.6	1191.7	860.1	776.9	83.2	0.5153	2.955_{18}	0.3384_{21}	153

SATURATED STEAM—*Continued.*

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int\frac{dt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
154	360.34_{52}	332.2	1191.8	859.6	776.3	83.3	0.5160	2.037_{18}	0.3407_{21}	154
155	360.86^{52}	332.7	1192.0	859.3	776.0	83.3	0.5166	2.019^{18}	0.3420^{21}	155
156	361.37^{51}_{51}	333.3	1192.2	858.9	775.6	83.3	0.5173	2.001^{18}_{17}	0.3447_{20}	156
157	361.88_{51}	333.8	1192.3	858.5	775.2	83.3	0.5179	2.884_{17}	0.3467_{21}	157
158	362.39^{51}	334.3	1192.5	858.2	774.8	83.4	0.5186	2.867^{17}	0.3488^{21}	158
159	362.90^{51}_{50}	334.9	1192.7	857.8	774.4	83.4	0.5192	2.850^{17}_{17}	0.3509^{21}	159
160	363.40_{50}	335.4	1192.8	857.4	774.0	83.4	0.5198	2.833_{17}	0.3530_{21}	160
161	363.90_{50}	335.9	1193.0	857.1	773.7	83.4	0.5205	2.816_{17}	0.3551_{21}	161
162	364.40^{50}	336.4	1193.1	856.7	772.2	83.5	0.5211	2.799^{17}	0.3572^{21}	162
163	364.90^{50}_{49}	337.0	1193.3	856.3	772.8	83.5	0.5217	2.783^{16}_{16}	0.3593^{21}	163
164	365.39_{49}	337.5	1193.4	855.9	772.4	83.5	0.5224	2.767_{16}	0.3614_{21}	164
165	365.88^{49}	338.0	1193.6	855.6	772.0	83.6	0.5230	2.751^{16}	0.3635^{21}	165
166	366.37^{49}_{48}	338.5	1193.7	855.2	771.6	83.6	0.5236	2.736^{15}_{15}	0.3655^{20}	166
167	366.85_{48}	339.0	1193.9	854.9	771.3	83.6	0.5242	2.721_{15}	0.3675_{20}	167
168	367.33^{48}	339.5	1194.0	854.5	770.9	83.6	0.5248	2.706^{15}	0.3695^{21}	168
169	367.81^{48}_{48}	340.0	1194.2	854.2	770.5	83.7	0.5254	2.691^{15}_{15}	0.3716^{21}	169
170	368.29_{48}	340.5	1194.3	853.8	770.1	83.7	0.5260	2.676_{15}	0.3737_{21}	170
171	368.77_{47}	341.0	1194.4	853.4	769.7	83.7	0.5266	2.661_{14}	0.3758_{20}	171
172	369.24^{47}	341.5	1194.6	853.1	769.4	83.7	0.5272	2.647^{15}	0.3778^{21}	172
173	369.71^{47}_{47}	342.0	1194.7	852.7	768.9	83.8	0.5278	2.632^{15}_{14}	0.3799^{21}	173
174	370.18_{47}	342.5	1194.8	852.3	768.5	83.8	0.5284	2.618_{15}	0.3820_{21}	174
175	370.65^{47}	343.0	1195.0	852.0	768.2	83.8	0.5290	2.603^{14}	0.3841^{21}	175
176	371.12^{47}_{47}	343.5	1195.1	851.6	767.8	83.8	0.5296	2.589^{14}_{14}	0.3862^{21}	176
177	371.59_{46}	344.0	1195.3	851.3	767.5	83.8	0.5302	2.575_{14}	0.3883_{21}	177
178	372.05^{46}	344.4	1195.4	851.0	767.1	83.9	0.5308	2.561^{14}	0.3904^{21}	178
179	372.51^{46}_{46}	344.9	1195.6	850.7	766.8	83.9	0.5313	2.548^{13}_{13}	0.3925^{20}	179
180	372.97_{46}	345.4	1195.7	850.3	766.4	83.9	0.5319	2.535_{13}	0.3945_{21}	180
181	373.43_{45}	345.9	1195.9	850.0	766.1	83.9	0.5325	2.522_{14}	0.3966_{21}	181
182	373.88^{45}	346.4	1196.0	849.6	765.6	84.0	0.5331	2.508^{14}	0.3987^{21}	182
183	374.33^{45}_{45}	346.8	1196.1	849.3	765.3	84.0	0.5336	2.495^{13}_{13}	0.4008^{21}	183
184	374.78_{45}	347.3	1196.2	848.9	764.9	84.0	0.5342	2.482_{12}	0.4029_{20}	184
185	375.23^{45}	347.8	1196.4	848.6	764.6	84.0	0.5347	2.470^{13}	0.4049^{21}	185
186	375.68^{45}_{44}	348.2	1196.5	848.3	764.3	84.0	0.5353	2.457^{13}_{12}	0.4070^{20}	186
187	376.12_{44}	348.7	1196.6	847.9	763.8	84.1	0.5359	2.445_{13}	0.4090_{21}	187
188	376.56^{44}	349.2	1196.8	847.6	763.5	84.1	0.5364	2.432^{12}	0.4111^{21}	188
189	377.00^{44}_{44}	349.6	1196.9	847.3	763.2	84.1	0.5370	2.420^{12}_{12}	0.4132^{21}	189
190	377.44_{44}	350.1	1197.1	847.0	762.9	84.1	0.5375	2.408_{12}	0.4153_{21}	190
191	377.88_{44}	350.5	1197.2	846.7	762.5	84.2	0.5381	2.396_{11}	0.4174_{20}	191
192	378.32^{44}	351.0	1197.3	846.3	762 1	84.2	0.5386	2.385^{12}	0.4194^{21}	192
193	378.75^{43}_{43}	351.4	1197.4	846.0	761.8	84.2	0.5391	2.373^{12}_{12}	0.4215^{21}	193

SATURATED STEAM—*Continued.*

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int\frac{dq}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
194	379.18_{43}	351.9	1197.6	845.7	761.5	84.2	0.5397	2.361_{12}	0.4236_{21}	194
195	379.61_{43}	352.4	1197.7	845.3	761.1	84.2	0.5402	2.349_{12}	0.4257_{21}	195
196	380.04_{43}	352.8	1197.8	845.0	760.8	84.2	0.5408	2.337_{12}	0.4278_{20}	196
197	380.47_{42}	353.3	1198.0	844.7	760.4	84.3	0.5413	2.325_{11}	0.4298_{20}	197
198	380.89_{42}	353.7	1198.1	844.4	760.1	84.3	0.5418	2.314_{10}	0.4318_{20}	198
199	381.31_{42}	354.1	1198.2	844.1	759.8	84.3	0.5423	2.304_{10}	0.4338_{21}	199
200	381.73_{42}	354.6	1198.4	843.8	759.5	84.3	0.5429	2.294_{10}	0.4359_{20}	200
201	382.15_{42}	355.0	1198.5	843.5	759.1	84.4	0.5434	2.284_{10}	0.4379_{20}	201
202	382.57_{42}	355.4	1198.6	843.2	758.8	84.4	0.5439	2.274_{11}	0.4399_{20}	202
203	382.99_{42}	355.9	1198.8	842.9	758.5	84.4	0.5444	2.263_{11}	0.4420_{21}	203
204	383.41_{41}	356.3	1198.9	842.6	758.2	84.4	0.5449	2.252_{11}	0.4441_{20}	204
205	383.82_{41}	356.8	1199.0	842.2	757.8	84.4	0.5454	2.241_{10}	0.4461_{21}	205
206	384.23_{41}	357.2	1199.1	841.9	757.4	84.5	0.5459	2.231_{10}	0.4482_{21}	206
207	384.64_{41}	357.6	1199.3	841.7	757.2	84.5	0.5465	2.221_{10}	0.4503_{21}	207
208	385.05_{41}	358.0	1199.4	841.4	756.9	84.5	0.5470	2.211_{10}	0.4524_{20}	208
209	385.46_{41}	358.5	1199.5	841.0	756.5	84.5	0.5475	2.200_{10}	0.4544_{21}	209
210	385.87_{41}	358.9	1199.6	840.7	756.2	84.5	0.5480	2.190_{10}	0.4565_{21}	210
211	386.28_{40}	359.3	1199.8	840.5	756.0	84.5	0.5485	2.180_{9}	0.4586_{21}	211
212	386.68_{40}	359.7	1199.9	840.2	755.6	84.6	0.5489	2.171_{9}	0.4607_{20}	212
213	387.08_{40}	360.1	1200.0	839.9	755.3	84.6	0.5494	2.162_{10}	0.4627_{21}	213
214	387.48_{40}	360.6	1200.1	839.5	754.9	84.6	0.5499	2.152_{10}	0.4648_{21}	214
215	387.88_{40}	361.0	1200.2	839.2	754.6	84.6	0.5504	2.142_{10}	0.4669_{21}	215
216	388.28_{39}	361.4	1200.4	839.0	754.4	84.6	0.5509	2.132_{9}	0.4690_{21}	216
217	388.67_{39}	361.8	1200.5	838.7	754.1	84.6	0.5514	2.123_{9}	0.4711_{20}	217
218	389.06_{39}	362.2	1200.6	838.4	753.8	84.6	0.5519	2.114_{9}	0.4731_{20}	218
219	389.45_{39}	362.6	1200.7	838.1	753.4	84.7	0.5524	2.105_{9}	0.4751_{21}	219
220	389.84_{39}	363.0	1200.8	837.8	753.1	84.7	0.5529	2.096_{9}	0.4772_{20}	220
221	390.23_{39}	363.5	1201.0	837.5	752.8	84.7	0.5533	2.087_{9}	0.4792_{21}	221
222	390.62_{39}	363.9	1201.1	837.2	752.5	84.7	0.5538	2.078_{9}	0.4813_{21}	222
223	391.01_{39}	364.3	1201.2	836.9	752.2	84.7	0.5543	2.069_{9}	0.4834_{21}	223
224	391.40_{39}	364.7	1201.3	836.6	751.9	84.7	0.5548	2.060_{9}	0.4855_{21}	224
225	391.79_{38}	365.1	1201.4	836.3	751.6	84.7	0.5553	2.051_{9}	0.4876_{21}	225
226	392.17_{38}	365.5	1201.6	836.1	751.3	84.8	0.5557	2.042_{8}	0.4896_{21}	226
227	392.55_{38}	365.9	1201.7	835.8	751.0	84.8	0.5562	2.034_{8}	0.4917_{20}	227
228	392.93_{38}	366.3	1201.8	835.5	750.7	84.8	0.5567	2.026_{9}	0.4937_{20}	228
229	393.31_{38}	366.7	1201.9	835.2	750.4	84.8	0.5571	2.017_{8}	0.4957_{20}	229
230	393.69_{38}	367.1	1202.0	834.9	750.1	84.8	0.5576	2.009_{8}	0.4979_{21}	230
231	394.07_{38}	367.5	1202.1	834.6	749.8	84.8	0.5581	2.001_{9}	0.5000_{21}	231
232	394.45_{37}	367.9	1202.2	834.3	749.5	84.8	0.5585	1.992_{8}	0.5021_{20}	232
233	394.82_{37}	368.3	1202.4	834.1	749.2	84.9	0.5590	1.984_{8}	0.5041_{21}	233

SATURATED STEAM — *Continued.*

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int \frac{dt}{T}$	Specific Volume. s	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure. Pounds per Square Inch. p
284	395.19_{37}	368.6	1202.5	833.9	740.0	84.9	0.5594	1.976_{8}	0.5062_{20}	**234**
235	395.56_{37}	369.0	1202.6	833.6	748.7	84.9	0.5599	1.968_{8}	0.5082_{21}	**235**
236	395.93_{37}	369.4	1202.7	833.3	748.4	84.9	0.5603	1.960_{8}	0.5103_{20}	**236**
237	396.30_{37}	369.8	1202.8	833.0	748.1	84.9	0.5608	1.952_{8}	0.5123_{21}	**237**
238	396.67_{37}	370.2	1202.9	832.7	747.8	84.9	0.5612	1.944_{8}	0.5144_{21}	**238**
239	397.04_{37}	370.6	1203.0	832.4	747.5	84.9	0.5617	1.936_{8}	0.5165_{21}	**239**
240	397.41_{36}	371.0	1203.2	832.2	747.3	84.9	0.5621	1.928_{7}	0.5186_{20}	**240**
241	397.77_{36}	371.3	1203.3	832.0	747.0	85.0	0.5626	1.921_{8}	0.5206_{20}	**241**
242	398.13_{36}	371.7	1203.4	831.7	746.7	85.0	0.5630	1.913_{8}	0.5226_{21}	**242**
243	398.49_{36}	372.1	1203.5	831.4	746.4	85.0	0.5635	1.906_{8}	0.5247_{21}	**243**
244	398.85_{36}	372.5	1203.6	831.1	746.1	85.0	0.5639	1.898_{7}	0.5268_{21}	**244**
245	399.21_{36}	372.8	1203.7	830.9	745.9	85.0	0.5643	1.891_{8}	0.5289_{22}	**245**
246	399.57_{36}	373.2	1203.8	830.6	745.6	85.0	0.5648	1.883_{8}	0.5311_{21}	**246**
247	399.93_{36}	373.6	1203.9	830.3	745.3	85.0	0.5652	1.875_{7}	0.5332_{21}	**247**
248	400.29_{35}	374.0	1204.0	830.0	745.0	85.0	0.5656	1.868_{7}	0.5353_{20}	**248**
249	400.64_{35}	374.3	1204.1	829.8	744.8	85.0	0.5661	1.861_{7}	0.5373_{20}	**249**
250	400.99_{35}	374.7	1204.2	829.5	744.5	85.0	0.5665	1.854_{7}	0.5393_{20}	**250**
251	401.34_{35}	375.1	1204.4	829.3	744.2	85.1	0.5669	1.847_{7}	0.5413_{20}	**251**
252	401.69_{35}	375.4	1204.5	829.1	744.0	85.1	0.5673	1.840_{7}	0.5433_{21}	**252**
253	402.04_{35}	375.8	1204.6	828.8	743.7	85.1	0.5678	1.833_{7}	0.5454_{21}	**253**
254	402.39_{35}	376.2	1204.7	828.5	743.4	85.1	0.5682	1.826_{7}	0.5475_{21}	**254**
255	402.74_{35}	376.5	1204.8	828.3	743.2	85.1	0.5686	1.819_{7}	0.5496_{21}	**255**
256	403.09_{35}	376.9	1204.9	828.0	742.9	85.1	0.5690	1.812_{7}	0.5517_{21}	**256**
257	403.44_{35}	377.3	1205.0	827.7	742.6	85.1	0.5695	1.805_{7}	0.5538_{21}	**257**
258	403.79_{35}	377.6	1205.1	827.5	742.4	85.1	0.5699	1.798_{7}	0.5559_{21}	**253**
259	404.13_{34}	378.0	1205.2	827.2	742.1	85.1	0.5703	1.792_{7}	0.5580_{21}	**259**
260	404.47_{34}	378.4	1205.3	826.9	741.7	85.2	0.5707	1.785_{6}	0.5601_{20}	**260**
261	404.81_{34}	378.7	1205.4	826.7	741.5	85.2	0.5711	1.779_{6}	0.5621_{21}	**261**
262	405.15_{34}	379.1	1205.5	826.4	741.2	85.2	0.5715	1.773_{7}	0.5642_{21}	**262**
263	405.49_{34}	379.4	1205.6	826.2	741.0	85.2	0.5719	1.766_{7}	0.5663_{21}	**263**
264	405.83_{34}	379.8	1205.7	825.9	740.7	85.2	0.5724	1.759_{6}	0.5684_{21}	**264**
265	406.17_{34}	380.2	1205.8	825.6	740.4	85.2	0.5728	1.753_{7}	0.5705_{21}	**265**
266	406.51_{33}	380.5	1205.9	825.4	740.2	85.2	0.5732	1.746_{6}	0.5726_{20}	**266**
267	406.84_{34}	380.8	1206.0	825.2	740.0	85.2	0.5736	1.740_{6}	0.5746_{21}	**267**
268	407.18_{34}	381.2	1206.1	824.9	739.7	85.2	0.5740	1.734_{6}	0.5767_{21}	**268**
269	407.52_{33}	381.5	1206.2	824.7	739.5	85.2	0.5744	1.728_{6}	0.5788_{21}	**269**
270	407.85_{33}	381.9	1206.3	824.4	739.2	85.2	0.5748	1.722_{6}	0.5809_{20}	**270**
271	408.18_{33}	382.2	1206.4	824.2	739.0	85.2	0.5752	1.716_{7}	0.5829_{21}	**271**
272	408.51_{33}	382.6	1206.5	823.9	738.6	85.3	0.5756	1.709_{6}	0.5850_{21}	**272**
273	408.84_{33}	382.9	1206.6	823.7	738.4	85.3	0.5760	1.703_{6}	0.5871_{21}	**273**

SATURATED STEAM—*Continued.*

Pressure. Pounds per Square Inch. p	Temperature. Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int\frac{dq}{T}$	Specific Volume. v	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure. Pounds per Square Inch. p
274	409.17_{33}	383.3	1206.7	823.4	738.1	85.3	0.5764	1.607_{6}	0.5802_{21}	274
275	409.50_{33}	383.6	1206.8	823.2	737.9	85.3	0.5768	1.601_{6}	0.5913_{21}	275
276	409.83_{33}	384.0	1206.9	822.9	737.6	85.3	0.5772	1.685_{6}	0.5934_{21}	276
277	410.16_{32}	384.3	1207.0	822.7	737.4	85.3	0.5776	1.679_{6}	0.5955_{21}	277
278	410.48_{32}	384.6	1207.1	822.5	737.2	85.3	0.5779	1.673_{6}	0.5976_{21}	278
279	410.80_{32}	385.0	1207.2	822.2	736.9	85.3	0.5783	1.668_{6}	0.5997_{23}	279
280	411.12_{33}	385.3	1207.3	822.0	736.7	85.3	0.5787	1.662_{6}	0.602_{2}	280
281	411.44_{32}	385.6	1207.4	821.8	736.5	85.3	0.5791	1.656_{6}	0.604_{2}	281
282	411.76_{32}	386.0	1207.5	821.5	736.2	85.3	0.5795	1.650_{5}	0.606_{2}	282
283	412.08_{32}	386.3	1207.6	821.3	736.0	85.3	0.5799	1.645_{4}	0.608_{2}	283
284	412.40_{32}	386.6	1207.7	821.1	735.8	85.3	0.5803	1.639_{5}	0.610_{2}	284
285	412.72_{32}	387.0	1207.8	820.8	735.5	85.3	0.5806	1.634_{5}	0.612_{2}	285
286	413.04_{32}	387.3	1207.9	820.6	735.3	85.3	0.5810	1.628_{5}	0.614_{2}	286
287	413.36_{32}	387.7	1208.0	820.3	735.0	85.3	0.5814	1.623_{6}	0.616_{2}	287
288	413.68_{32}	388.0	1208.1	820.1	734.7	85.4	0.5818	1.617_{5}	0.618_{2}	288
289	414.00_{32}	388.3	1208.2	819.9	734.5	85.4	0.5822	1.612_{5}	0.620_{2}	289
290	414.32_{31}	388.6	1208.3	819.7	734.3	85.4	0.5826	1.607_{6}	0.622_{3}	290
291	414.63_{31}	389.0	1208.4	819.4	734.0	85.4	0.5829	1.601_{5}	0.625_{2}	291
292	414.94_{31}	389.3	1208.5	819.2	733.8	85.4	0.5833	1.596_{5}	0.627_{2}	292
293	415.25_{31}	389.6	1208.6	819.0	733.6	85.4	0.5837	1.591_{6}	0.629_{2}	293
294	415.56_{31}	390.0	1208.7	818.7	733.3	85.4	0.5840	1.585_{5}	0.631_{2}	294
295	415.87_{31}	390.3	1208.8	818.5	733.1	85.4	0.5844	1.580_{5}	0.633_{2}	295
296	416.18_{31}	390.6	1208.9	818.3	732.9	85.4	0.5848	1.575_{5}	0.635_{2}	296
297	416.49_{31}	390.9	1209.0	818.1	732.7	85.4	0.5851	1.570_{6}	0.637_{2}	297
298	416.80_{31}	391.3	1209.1	817.8	732.4	85.4	0.5855	1.564_{5}	0.639_{2}	298
299	417.11_{31}	391.6	1209.2	817.6	732.2	85.4	0.5859	1.559_{5}	0.641_{3}	299
300	417.42_{30}	391.9	1209.3	817.4	732.0	85.4	0.5863	1.554_{5}	0.644_{2}	300
301	417.72_{30}	392.2	1209.3	817.1	731.7	85.4	0.5866	1.549_{5}	0.646_{2}	301
302	418.02_{30}	392.5	1209.4	816.9	731.5	85.4	0.5870	1.544_{5}	0.648_{2}	302
303	418.32_{30}	392.8	1209.5	816.7	731.3	85.4	0.5873	1.539_{5}	0.650_{2}	303
304	418.62_{30}	393.2	1209.6	816.4	731.0	85.4	0.5877	1.534_{5}	0.652_{2}	304
305	418.92_{30}	393.5	1209.7	816.2	730.8	85.4	0.5880	1.529_{5}	0.654_{2}	305
306	419.22_{30}	393.8	1209.8	816.0	730.6	85.4	0.5884	1.524_{4}	0.656_{2}	306
307	419.52_{30}	394.1	1209.9	815.8	730.4	85.4	0.5888	1.520_{5}	0.658_{2}	307
308	419.82_{30}	394.4	1210.0	815.6	730.2	85.4	0.5891	1.515_{5}	0.660_{2}	308
309	420.12_{30}	394.7	1210.1	815.4	730.0	85.4	0.5895	1.510_{5}	0.662_{2}	309
310	420.42_{30}	395.0	1210.2	815.2	729.8	85.4	0.5898	1.505_{5}	0.664_{2}	310
311	420.72_{30}	395.4	1210.3	814.9	729.5	85.4	0.5902	1.500_{4}	0.666_{2}	311
312	421.02_{30}	395.7	1210.4	814.7	729.3	85.4	0.5905	1.496_{5}	0.668_{2}	312
313	421.32_{30}	396.0	1210.4	814.4	729.0	85.4	0.5909	1.491_{5}	0.671_{2}	313

SATURATED STEAM.—*Continued.*

Pressure, Pounds per Square Inch. p	Temperature, Degrees Fahr. t	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\nu$	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. ν	Density. Weight, in Pounds, of one Cubic Foot. γ	Pressure, Pounds per Square Inch. p
314	421.62_{30}	396.3	1210.5	814.2	728.7	85.5	0.5913	1.486_{5}	0.673_{2}	**314**
315	421.92_{29}	396.6	1210.6	814.0	728.5	85.5	0.5916	1.481^{3}_{4}	0.675^{2}_{2}	**315**
316	422.21_{29}	396.9	1210.7	813.8	728.3	85.5	0.5919	1.477^{4}_{5}	0.677^{2}_{2}	**316**
317	422.50_{29}	397.2	1210.8	813.6	728.1	85.5	0.5923	1.472_{4}	0.679_{2}	**317**
318	422.79_{29}	397.5	1210.9	813.4	727.9	85.5	0.5926	1.468^{4}_{5}	0.681^{2}_{2}	**318**
319	423.08_{29}	397.8	1211.0	813.2	727.7	85.5	0.5930	1.464^{4}_{5}	0.683^{2}_{2}	**319**
320	423.37_{29}	398.1	1211.1	813.0	727.5	85.5	0.5933	1.459_{5}	0.685_{3}	**320**
321	423.66_{29}	398.4	1211.2	812.8	727.3	85.5	0.5937	1.454_{4}	0.688_{2}	**321**
322	423.95_{29}	398.7	1211.2	812.5	727.0	85.5	0.5940	1.450^{5}_{4}	0.690^{1}_{2}	**322**
323	424.24_{29}	399.0	1211.3	812.3	726.8	85.5	0.5944	1.445^{5}_{4}	0.692^{1}_{2}	**323**
324	424.53_{29}	399.3	1211.4	812.1	726.6	85.5	0.5947	1.441_{4}	0.694_{2}	**324**
325	424.82_{28}	399.6	1211.5	811.9	726.4	85.5	0.5950	1.437^{5}_{4}	0.696^{1}_{2}	**325**
326	425.10_{28}	399.9	1211.6	811.7	726.2	85.5	0.5954	1.432^{5}_{4}	0.698^{1}_{2}	**326**
327	425.38_{29}	400.2	1211.7	811.5	726.0	85.5	0.5957	1.428_{4}	0.700_{2}	**327**
328	425.67_{29}	400.5	1211.8	811.3	725.8	85.5	0.5960	1.424_{4}	0.702^{1}_{2}	**328**
329	425.96_{28}	400.8	1211.9	811.1	725.6	85.5	0.5964	1.420_{5}	0.704^{1}_{3}	**329**
330	426.24_{28}	401.1	1211.9	810.8	725.3	85.5	0.5967	1.415_{4}	0.707_{2}	**330**
331	426.52_{28}	401.4	1212.0	810.6	725.1	85.5	0.5970	1.411_{4}	0.709_{2}	**331**
332	426.80_{28}	401.7	1212.1	810.4	724.9	85.5	0.5974	1.407_{4}	0.711^{1}_{2}	**332**
333	427.08_{28}	402.0	1212.2	810.2	724.7	85.5	0.5977	1.403_{4}	0.713^{1}_{2}	**333**
334	427.36_{28}	402.3	1212.3	810.0	724.5	85.5	0.5980	1.399_{4}	0.715_{2}	**334**
335	427.64_{28}	402.6	1212.4	809.8	724.3	85.5	0.5984	1.395_{4}	0.717^{1}_{2}	**335**
336	427.92_{28}	402.9	1212.5	809.6	724.1	85.5	0.5987	1.391_{4}	0.719^{1}_{2}	**336**

TABLE III.

SATURATED STEAM.

FRENCH UNITS

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int\frac{dt}{T}$	Specific Volume. ω	Density. Weight, in Kilos., of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	4.602_{339}	0.000	606.5	606.5	575.5	31.0	0.00000	211.5_{138}	0.004730_{327}	0
1	4.941_{362}	1.007	606.8	605.8	574.7	31.1	0.00367	197.7_{131}	0.005057_{300}	1
2	5.303_{386}	2.014	607.1	605.1	573.9	31.2	0.00733	184.6_{122}	0.005417_{283}	2
3	5.689_{411}	3.022	607.4	604.4	573.2	31.2	0.01098	172.4_{112}	0.005800_{403}	3
4	6.100_{436}	4.029	607.7	603.7	572.4	31.3	0.01461	161.2_{104}	0.006203_{427}	4
5	6.536_{465}	5.036	608.0	603.0	571.6	31.4	0.01823	150.8_{96}	0.006630_{450}	5
6	7.001_{493}	6.040	608.3	602.3	570.8	31.5	0.02183	141.2_{90}	0.007080_{481}	6
7	7.494_{525}	7.045	608.6	601.6	570.0	31.6	0.02542	132.2_{83}	0.007561_{508}	7
8	8.019_{557}	8.049	608.9	600.9	569.3	31.6	0.02899	123.9_{77}	0.008069_{539}	8
9	8.576_{591}	9.054	609.2	600.1	568.4	31.7	0.03255	116.2_{72}	0.008608_{569}	9
10	9.167_{628}	10.058	609.6	599.5	567.7	31.8	0.03609	109.0_{67}	0.009177_{602}	10
11	9.795_{665}	11.060	609.9	598.8	566.9	31.9	0.03962	102.3_{62}	0.009779_{631}	11
12	10.460_{704}	12.061	610.2	598.1	566.1	32.0	0.04313	96.00_{580}	0.01041_{67}	12
13	11.164_{747}	13.063	610.5	597.4	565.3	32.1	0.04663	90.19_{543}	0.01108_{71}	13
14	11.911_{791}	14.064	610.8	596.7	564.5	32.2	0.05012	84.76_{507}	0.01179_{76}	14
15	12.702_{837}	15.063	611.1	596.0	563.8	32.2	0.05359	79.69_{472}	0.01255_{79}	15
16	13.539_{884}	16.066	611.4	595.3	563.0	32.3	0.05705	74.97_{441}	0.01334_{83}	16
17	14.423_{937}	17.066	611.7	594.6	562.2	32.4	0.06050	70.56_{412}	0.01417_{88}	17
18	15.360_{989}	18.066	612.0	593.9	561.4	32.5	0.06390	66.44_{380}	0.01505_{93}	18
19	16.349_{1046}	19.066	612.3	593.2	560.6	32.6	0.06735	62.58_{360}	0.01598_{97}	19
20	17.395_{1103}	20.066	612.6	592.5	559.8	32.7	0.07076	58.98_{337}	0.01695_{103}	20
21	18.498_{1165}	21.064	612.9	591.8	559.0	32.8	0.07415	55.61_{315}	0.01798_{108}	21
22	19.663_{1229}	22.063	613.2	591.1	558.2	32.9	0.07754	52.46_{295}	0.01906_{114}	22
23	20.892_{1296}	23.061	613.5	590.4	557.5	32.9	0.08091	49.51_{277}	0.02020_{119}	23
24	22.188_{1366}	24.059	613.8	589.7	556.7	33.0	0.08427	46.74_{259}	0.02139_{126}	24
25	23.554_{1440}	25.058	614.1	589.0	555.9	33.1	0.08762	44.15_{243}	0.02265_{132}	25
26	24.994_{1516}	26.053	614.4	588.3	555.1	33.2	0.09094	41.72_{227}	0.02397_{138}	26
27	26.510_{1597}	27.048	614.7	587.7	554.4	33.3	0.09426	39.45_{214}	0.02535_{145}	27
28	28.107_{1679}	28.042	615.0	587.0	553.6	33.4	0.09756	37.31_{201}	0.02680_{153}	28
29	29.780_{1767}	29.037	615.3	586.3	552.8	33.5	0.10085	35.30_{188}	0.02833_{159}	29
30	31.553_{1858}	30.032	615.7	585.7	552.1	33.6	0.10413	33.42_{177}	0.02992_{168}	30

SATURATED STEAM—*Continued.*

Temperature, Degrees Centi-grade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\alpha$	Entropy of the Liquid. $\int \frac{dt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centi-grade. t
31	33.411_{1953}	31.027	616.0	585.0	551.3	33.7	0.10740	31.65_{167}	0.03160_{175}	31
32	35.364_{2052}	32.023	616.3	584.3	550.5	33.8	0.11067	29.98_{156}	0.03335_{184}	32
33	37.416_{2155}	33.018	616.6	583.6	549.7	33.9	0.11392	28.42_{148}	0.03519_{193}	33
34	39.571_{2262}	34.014	616.9	582.9	548.9	34.0	0.11716	26.94_{138}	0.03712_{201}	34
35	41.833_{2374}	35.009	617.2	582.2	548.2	34.0	0.12039	25.56_{131}	0.03913_{211}	35
36	44.207_{2490}	36.007	617.5	581.5	547.4	34.1	0.12362	24.25_{123}	0.04124_{220}	36
37	46.697_{2611}	37.005	617.8	580.8	546.6	34.2	0.12683	23.02_{116}	0.04344_{230}	37
38	49.308_{2742}	38.004	618.1	580.1	545.8	34.3	0.13004	21.86_{109}	0.04574_{241}	38
39	52.05_{286}	39.002	618.4	579.4	545.0	34.4	0.13324	20.77_{103}	0.04815_{251}	39
40	54.91_{301}	40.0	618.7	578.7	544.2	34.5	0.1364	19.74_{98}	0.05066_{263}	40
41	57.92_{314}	41.0	619.0	578.0	543.4	34.6	0.1396	18.76_{92}	0.05329_{275}	41
42	61.06_{329}	42.0	619.3	577.3	542.6	34.7	0.1428	17.84_{86}	0.05604_{285}	42
43	64.35_{345}	43.0	619.6	576.6	541.8	34.8	0.1459	16.98_{82}	0.05889_{208}	43
44	67.80_{360}	44.0	619.9	575.9	541.0	34.9	0.1491	16.16_{77}	0.06187_{310}	44
45	71.40_{376}	45.0	620.2	575.2	540.2	35.0	0.1522	15.39_{73}	0.06497_{325}	45
46	75.16_{394}	46.0	620.5	574.5	539.4	35.1	0.1554	14.66_{69}	0.06822_{338}	46
47	79.10_{411}	47.0	620.8	573.8	538.6	35.2	0.1585	13.97_{66}	0.07160_{352}	47
48	83.21_{430}	48.0	621.1	573.1	537.8	35.3	0.1617	13.31_{62}	0.07512_{366}	48
49	87.51_{447}	49.0	621.4	572.4	537.0	35.4	0.1648	12.69_{58}	0.07878_{381}	49
50	91.98_{467}	50.0	621.8	571.8	536.3	35.5	0.1679	12.11_{55}	0.08259_{394}	50
51	96.65_{489}	51.0	622.1	571.1	535.5	35.6	0.1710	11.56_{53}	0.08653_{416}	51
52	101.54_{510}	52.1	622.4	570.3	534.6	35.7	0.1741	11.03_{50}	0.09069_{428}	52
53	106.64_{531}	53.1	622.7	569.6	533.8	35.8	0.1772	10.53_{47}	0.09497_{443}	53
54	111.95_{554}	54.1	623.0	568.9	533.0	35.9	0.1803	10.06_{45}	0.09940_{470}	54
55	117.49_{576}	55.1	623.3	568.2	532.2	36.0	0.1833	9.610_{425}	0.1041_{48}	55
56	123.25_{601}	56.1	623.6	567.5	531.4	36.1	0.1864	9.185_{403}	0.1089_{50}	56
57	129.26_{625}	57.1	623.9	566.8	530.7	36.1	0.1895	8.782_{383}	0.1139_{52}	57
58	135.51_{651}	58.1	624.2	566.1	529.9	36.2	0.1925	8.399_{363}	0.1191_{54}	58
59	142.02_{678}	59.1	624.5	565.4	529.1	36.3	0.1956	8.036_{349}	0.1245_{56}	59
60	148.80_{705}	60.1	624.8	564.7	528.3	36.4	0.1986	7.687_{325}	0.1301_{57}	60
61	155.85_{733}	61.1	625.1	564.0	527.5	36.5	0.2016	7.362_{311}	0.1358_{60}	61
62	163.18_{762}	62.1	625.4	563.3	526.7	36.6	0.2046	7.051_{297}	0.1418_{63}	62
63	170.80_{792}	63.1	625.7	562.6	525.9	36.7	0.2076	6.754_{284}	0.1481_{65}	63
64	178.72_{823}	64.2	626.0	561.8	525.0	36.8	0.2106	6.470_{269}	0.1546_{67}	64
65	186.95_{855}	65.2	626.3	561.1	524.2	36.9	0.2136	6.201_{254}	0.1613_{69}	65
66	195.50_{888}	66.2	626.6	560.4	523.4	37.0	0.2166	5.947_{242}	0.1682_{71}	66
67	204.38_{922}	67.2	626.9	559.7	522.6	37.1	0.2196	5.705_{233}	0.1753_{74}	67
68	213.60_{957}	68.2	627.2	559.0	521.8	37.2	0.2225	5.472_{222}	0.1827_{78}	68
69	223.17_{992}	69.2	627.5	558.3	521.0	37.3	0.2254	5.250_{210}	0.1905_{80}	69
70	233.09_{1030}	70.2	627.9	557.7	520.3	37.4	0.2284	5.040_{201}	0.1985_{82}	70

SATURATED STEAM — *Continued.*

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apu	Entropy of the Liquid. $\int \frac{dq}{T}$	Specific Volume. v	Density. Weight, in Kilos., of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
71	243.39_{1068}	71.2	628.2	557.0	519.5	37.5	0.2313	4.839_{191}	0.2067_{84}	**71**
72	254.07_{1107}	72.2	628.5	556.3	518.7	37.6	0.2342	4.648_{183}	0.2151_{88}	**72**
73	265.14_{1148}	73.2	628.8	555.6	517.9	37.7	0.2371	4.465_{174}	0.2239_{91}	**73**
74	276.62_{1189}	74.2	629.1	554.9	517.1	37.8	0.2400	4.291_{167}	0.2330_{95}	**74**
75	288.51_{1232}	75.2	629.4	554.2	516.3	37.9	0.2429	4.124_{159}	0.2425_{97}	**75**
76	300.83_{1276}	76.2	629.7	553.5	515.5	38.0	0.2458	3.965_{152}	0.2522_{101}	**76**
77	313.59_{1321}	77.3	630.0	552.7	514.6	38.1	0.2487	3.813_{145}	0.2623_{103}	**77**
78	326.80_{1368}	78.3	630.3	552.0	513.8	38.2	0.2516	3.668_{139}	0.2726_{107}	**78**
79	340.48_{1415}	79.3	630.6	551.3	513.0	38.3	0.2544	3.529_{132}	0.2833_{111}	**79**
80	354.63_{1464}	80.3	630.9	550.6	512.3	38.3	0.2573	3.397_{127}	0.2944_{114}	**80**
81	369.27_{1514}	81.3	631.2	549.9	511.5	38.4	0.2601	3.270_{121}	0.3058_{118}	**81**
82	384.41_{1567}	82.3	631.5	549.2	510.7	38.5	0.2630	3.149_{116}	0.3176_{122}	**82**
83	400.08_{1619}	83.3	631.8	548.5	509.9	38.6	0.2658	3.033_{111}	0.3298_{125}	**83**
84	416.27_{1674}	84.3	632.1	547.8	509.1	38.7	0.2686	2.922_{107}	0.3423_{129}	**84**
85	433.01_{1730}	85.3	632.4	547.1	508.3	38.8	0.2714	2.815_{101}	0.3552_{133}	**85**
86	450.31_{1787}	86.3	632.7	546.4	507.5	38.9	0.2742	2.714_{98}	0.3685_{137}	**86**
87	468.18_{1846}	87.3	633.0	545.7	506.7	39.0	0.2770	2.616_{93}	0.3822_{143}	**87**
88	486.64_{1907}	88.3	633.3	545.0	505.9	39.1	0.2798	2.523_{90}	0.3965_{146}	**88**
89	505.71_{1969}	89.4	633.6	544.2	505.0	39.2	0.2826	2.433_{86}	0.4111_{149}	**89**
90	525.40_{2032}	90.4	634.0	543.6	504.3	39.3	0.2854	2.347_{82}	0.4260_{155}	**90**
91	545.72_{2098}	91.4	634.3	542.9	503.6	39.3	0.2881	2.265_{79}	0.4415_{160}	**91**
92	566.70_{2164}	92.4	634.6	542.2	502.8	39.4	0.2909	2.186_{76}	0.4575_{164}	**92**
93	588.34_{2233}	93.4	634.9	541.5	502.0	39.5	0.2937	2.110_{72}	0.4739_{169}	**93**
94	610.67_{2303}	94.4	635.2	540.8	501.2	39.6	0.2964	2.038_{70}	0.4908_{173}	**94**
95	633.70_{2375}	95.4	635.5	540.1	500.4	39.7	0.2991	1.968_{67}	0.5081_{180}	**95**
96	657.45_{2448}	96.4	635.8	539.4	499.6	39.8	0.3019	1.901_{65}	0.5261_{184}	**96**
97	681.93_{2524}	97.4	636.1	538.7	498.8	39.9	0.3046	1.836_{62}	0.5445_{191}	**97**
98	707.17_{2602}	98.4	636.4	538.0	498.1	39.9	0.3073	1.774_{59}	0.5636_{195}	**98**
99	733.19_{2681}	99.4	636.7	537.3	497.3	40.0	0.3100	1.715_{54}	0.5831_{191}	**99**
100	760.00_{275}	100.4	637.0	536.6	496.4	40.2	0.3127	1.661_{52}	0.6024_{195}	**100**
101	787.5_{283}	101.4	637.3	535.9	495.6	40.3	0.3154	1.609_{53}	0.6219_{208}	**101**
102	815.8_{292}	102.5	637.6	535.1	494.7	40.4	0.3181	1.556_{51}	0.6427_{218}	**102**
103	845.0_{301}	103.5	637.9	534.4	493.9	40.5	0.3208	1.505_{49}	0.6645_{223}	**103**
104	875.1_{309}	104.5	638.2	533.7	493.2	40.5	0.3235	1.456_{47}	0.6868_{229}	**104**
105	906.0_{319}	105.5	638.5	533.0	492.4	40.6	0.3261	1.409_{47}	0.7097_{236}	**105**
106	937.9_{328}	106.5	638.8	532.3	491.6	40.7	0.3288	1.365_{45}	0.7333_{243}	**106**
107	970.7_{337}	107.5	639.1	531.6	490.8	40.8	0.3314	1.320_{42}	0.7576_{249}	**107**
108	1004.4_{347}	108.5	639.4	530.9	490.1	40.8	0.3341	1.278_{40}	0.7825_{255}	**108**
109	1039.1_{356}	109.5	639.7	530.2	489.3	40.9	0.3367	1.248_{39}	0.8080_{260}	**109**
110	1074.7_{367}	110.5	640.1	529.6	488.6	41.0	0.3393	1.209_{37}	0.8340_{268}	**110**

SATURATED STEAM — *Continued.*

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\alpha$	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
111	1111.4_{377}	111.5	640.4	528.9	487.8	41.1	0.3420	1.162_{36}	0.8608_{275}	111
112	1149.1_{388}	112.5	640.7	528.2	487.0	41.2	0.3446	1.126_{35}	0.8883_{283}	112
113	1187.9_{398}	113.5	641.0	527.5	486.3	41.2	0.3471	1.091_{34}	0.9166_{290}	113
114	1227.7_{410}	114.6	641.3	526.7	485.4	41.3	0.3498	1.057_{32}	0.9456_{299}	114
115	1268.7_{420}	115.6	641.6	526.0	484.6	41.4	0.3524	1.025_{31}	0.9755_{305}	115
116	1310.7_{432}	116.6	641.9	525.3	483.8	41.5	0.3550	0.9942_{299}	1.006_{31}	116
117	1353.9_{444}	117.6	642.2	524.6	483.1	41.5	0.3576	0.9643_{289}	1.037_{32}	117
118	1398.3_{455}	118.6	642.5	523.9	482.3	41.6	0.3601	0.9354_{278}	1.069_{33}	118
119	1443.8_{467}	119.6	642.8	523.2	481.5	41.7	0.3627	0.9076_{268}	1.102_{33}	119
120	1490.5_{480}	120.6	643.1	522.5	480.7	41.8	0.3653	0.8808_{258}	1.135_{35}	120
121	1538.5_{492}	121.6	643.4	521.8	480.0	41.8	0.3678	0.8550_{250}	1.170_{35}	121
122	1587.7_{506}	122.6	643.7	521.1	479.2	41.9	0.3704	0.8300_{241}	1.205_{36}	122
123	1638.3_{518}	123.6	644.0	520.4	478.4	42.0	0.3729	0.8059_{233}	1.241_{37}	123
124	1690.1_{532}	124.6	644.3	519.7	477.6	42.1	0.3755	0.7826_{224}	1.278_{37}	124
125	1743.3_{545}	125.6	644.6	519.0	476.8	42.2	0.3780	0.7602_{216}	1.315_{39}	125
126	1797.8_{559}	126.6	644.9	518.3	476.1	42.2	0.3805	0.7386_{211}	1.354_{40}	126
127	1853.7_{573}	127.7	645.2	517.5	475.2	42.3	0.3830	0.7175_{203}	1.394_{40}	127
128	1911.0_{587}	128.7	645.5	516.8	474.4	42.4	0.3856	0.6973_{195}	1.434_{41}	128
129	1969.7_{601}	129.7	645.8	516.1	473.6	42.5	0.3881	0.6778_{187}	1.475_{42}	129
130	2029.8_{617}	130.7	646.2	515.5	473.0	42.5	0.3906	0.6591_{183}	1.517_{43}	130
131	2091.5_{633}	131.7	646.5	514.8	472.2	42.6	0.3931	0.6408_{177}	1.560_{45}	131
132	2154.8_{647}	132.7	646.8	514.1	471.4	42.7	0.3955	0.6231_{170}	1.605_{45}	132
133	2219.5_{663}	133.7	647.1	513.4	470.6	42.8	0.3980	0.6061_{165}	1.650_{46}	133
134	2285.8_{679}	134.7	647.4	512.7	469.8	42.9	0.4005	0.5896_{160}	1.696_{47}	134
135	2353.7_{695}	135.7	647.7	512.0	469.1	42.9	0.4030	0.5736_{153}	1.743_{48}	135
136	2423.2_{712}	136.7	648.0	511.3	468.3	43.0	0.4054	0.5583_{149}	1.791_{49}	136
137	2494.4_{728}	137.7	648.3	510.6	467.5	43.1	0.4079	0.5434_{145}	1.840_{51}	137
138	2567.2_{745}	138.7	648.6	509.9	466.7	43.2	0.4103	0.5289_{140}	1.891_{51}	138
139	2641.7_{762}	139.8	648.9	509.1	465.9	43.2	0.4128	0.5149_{136}	1.942_{53}	139
140	2717.9_{780}	140.8	649.2	508.4	465.1	43.3	0.4152	0.5013_{130}	1.995_{53}	140
141	2795.9_{798}	141.8	649.5	507.7	464.3	43.4	0.4177	0.4883_{127}	2.048_{55}	141
142	2875.7_{816}	142.8	649.8	507.0	463.5	43.5	0.4201	0.4756_{123}	2.103_{55}	142
143	2957.3_{835}	143.8	650.1	506.3	462.8	43.5	0.4225	0.4633_{119}	2.158_{57}	143
144	3040.8_{853}	144.8	650.4	505.6	462.0	43.6	0.4249	0.4514_{115}	2.215_{58}	144
145	3126.1_{872}	145.8	650.7	504.9	461.2	43.7	0.4273	0.4399_{112}	2.273_{59}	145
146	3213.3_{892}	146.8	651.0	504.2	460.4	43.8	0.4297	0.4287_{108}	2.232_{60}	146
147	3302.5_{911}	147.8	651.3	503.5	459.6	43.9	0.4321	0.4179_{105}	2.392_{62}	147
148	3393.6_{931}	148.8	651.6	502.8	458.9	43.9	0.4325	0.4074_{101}	2.454_{63}	148
149	3486.7_{952}	149.8	651.9	502.1	458.1	44.0	0.4369	0.3973_{98}	2.517_{64}	149
150	3581.9_{972}	150.8	652.3	501.5	457.4	44.1	0.4393	0.3875_{96}	2.581_{65}	150

SATURATED STEAM — *Continued.*

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int\frac{dq}{T}$	Specific Volume. v	Density. Weight, in Kilos., of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
151	3679.1 ^{993}	151.8	652.6	500.8	456.6	44.2	0.4417	0.3779 ^{93}	2.646 ^{67}	151
152	3778.4 ^{1014}	152.9	652.9	500.0	455.8	44.2	0.4440	0.3686 ^{90}	2.713 ^{68}	152
153	3879.8 ^{1035}	153.9	653.2	499.3	455.0	44.3	0.4464	0.3596 ^{87}	2.781 ^{69}	153
154	3983.3 ^{1057}	154.9	653.5	498.6	454.2	44.4	0.4488	0.3509 ^{85}	2.850 ^{70}	154
155	4089.0 ^{1079}	155.9	653.8	497.9	453.4	44.5	0.4511	0.3424 ^{82}	2.920 ^{72}	155
156	4196.9 ^{1102}	156.9	654.1	497.2	452.7	44.5	0.4536	0.3342 ^{80}	2.992 ^{74}	156
157	4307.1 ^{1124}	158.0	654.4	496.4	451.8	44.6	0.4560	0.3262 ^{78}	3.066 ^{75}	157
158	4419.5 ^{1148}	159.0	654.7	495.7	450.0	44.7	0.4584	0.3184 ^{76}	3.141 ^{76}	158
159	4534.3 ^{1171}	160.1	655.0	494.9	449.2	44.7	0.4608	0.3108 ^{73}	3.217 ^{78}	159
160	4651.4 ^{1195}	161.1	655.3	494.2	449.4	44.8	0.4633	0.3035 ^{71}	3.295 ^{79}	160
161	4770.9 ^{1218}	162.2	655.6	493.4	448.5	44.9	0.4657	0.2964 ^{69}	3.374 ^{80}	161
162	4892.7 ^{1243}	163.2	655.9	492.7	447.7	45.0	0.4681	0.2895 ^{67}	3.454 ^{82}	162
163	5017. ^{127}	164.2	656.2	492.0	447.0	45.0	0.4705	0.2828 ^{66}	3.536 ^{84}	163
164	5144. ^{129}	165.3	656.5	491.2	446.1	45.1	0.4729	0.2762 ^{63}	3.620 ^{85}	164
165	5273. ^{132}	166.3	656.8	490.5	445.3	45.2	0.4752	0.2699 ^{62}	3.705 ^{87}	165
166	5405. ^{134}	167.4	657.1	489.7	444.5	45.2	0.4776	0.2637 ^{60}	3.792 ^{88}	166
167	5539. ^{137}	168.4	657.4	489.0	443.7	45.3	0.4800	0.2577 ^{58}	3.880 ^{90}	167
168	5676. ^{140}	169.5	657.7	488.2	442.9	45.3	0.4824	0.2519 ^{57}	3.970 ^{91}	168
169	5816. ^{143}	170.5	658.0	487.5	442.1	45.4	0.4847	0.2462 ^{55}	4.061 ^{93}	169
170	5959. ^{145}	171.6	658.4	486.8	441.3	45.5	0.4871	0.2407 ^{53}	4.154 ^{94}	170
171	6104. ^{147}	172.6	658.7	486.1	440.5	45.6	0.4895	0.2354 ^{52}	4.248 ^{97}	171
172	6251. ^{151}	173.7	659.0	485.3	439.7	45.6	0.4918	0.2302 ^{51}	4.345 ^{99}	172
173	6402. ^{153}	174.7	659.3	484.6	438.9	45.7	0.4941	0.2251 ^{50}	4.444 ^{99}	173
174	6555. ^{157}	175.8	659.6	483.8	438.1	45.7	0.4965	0.2201 ^{48}	4.543 ^{101}	174
175	6712. ^{159}	176.8	659.9	483.1	437.3	45.8	0.4988	0.2153 ^{47}	4.644 ^{103}	175
176	6871. ^{162}	177.8	660.2	482.4	436.5	45.9	0.5011	0.2106 ^{45}	4.747 ^{105}	176
177	7033. ^{165}	178.9	660.5	481.6	435.7	45.9	0.5035	0.2061 ^{44}	4.852 ^{107}	177
178	7198. ^{168}	179.9	660.8	480.9	434.9	46.0	0.5058	0.2017 ^{44}	4.959 ^{109}	178
179	7366. ^{171}	181.0	661.1	480.1	434.0	46.1	0.5081	0.1973 ^{42}	5.068 ^{110}	179
180	7537. ^{175}	182.0	661.4	479.4	433.3	46.1	0.5104	0.1931 ^{41}	5.178 ^{113}	180
181	7712. ^{177}	183.1	661.7	478.6	432.4	46.2	0.5127	0.1890 ^{40}	5.291 ^{114}	181
182	7889. ^{181}	184.1	662.0	477.9	431.7	46.2	0.5150	0.1850 ^{39}	5.405 ^{117}	182
183	8070. ^{183}	185.2	662.3	477.1	430.8	46.3	0.5173	0.1811 ^{38}	5.522 ^{118}	183
184	8253. ^{187}	186.2	662.6	476.4	430.1	46.3	0.5196	0.1773 ^{37}	5.640 ^{120}	184
185	8440. ^{191}	187.3	662.9	475.6	429.2	46.4	0.5219	0.1736 ^{36}	5.760 ^{122}	185
186	8631. ^{193}	188.3	663.2	474.9	428.5	46.4	0.5242	0.1700 ^{36}	5.882 ^{125}	186
187	8824. ^{197}	189.4	663.5	474.1	427.6	46.5	0.5264	0.1664 ^{34}	6.007 ^{127}	187
188	9021. ^{201}	190.4	663.8	473.4	426.9	46.5	0.5287	0.1630 ^{33}	6.134 ^{128}	188
189	9222. ^{204}	191.4	664.1	472.7	426.1	46.6	0.5310	0.1597 ^{33}	6.262 ^{130}	189
190	9426. ^{207}	192.5	664.5	472.0	425.3	46.7	0.5332	0.1564 ^{32}	6.392 ^{133}	190

SATURATED STEAM — *Concluded.*

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $A p_H$	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
191	$9633._{211}$	193.5	664.8	471.3	424.6	46.7	0.5355	0.1532_{31}	6.525_{136}	191
192	$9844._{214}$	194.6	665.1	470.5	423.7	46.8	0.5377	0.1501_{30}	6.661_{137}	192
193	$10058._{218}$	195.6	665.4	469.8	423.0	46.8	0.5400	0.1471_{30}	6.798_{140}	193
194	$10276._{222}$	196.7	665.7	469.0	422.2	46.8	0.5422	0.1441_{29}	6.938_{142}	194
195	$10498._{226}$	197.7	666.0	468.3	421.4	46.9	0.5444	0.1412_{28}	7.080_{145}	195
196	$10724._{229}$	198.8	666.3	467.5	420.6	46.9	0.5467	0.1384_{27}	7.225_{147}	196
197	$10953._{233}$	199.8	666.6	466.8	419.8	47.0	0.5489	0.1357_{27}	7.372_{149}	197
198	$11186._{238}$	200.9	666.9	466.0	419.0	47.0	0.5511	0.1330_{27}	7.521_{151}	198
199	$11424._{240}$	201.9	667.2	465.3	418.2	47.1	0.5533	0.1303_{26}	7.672_{155}	199
200	$11664._{245}$	203.0	667.5	464.5	417.4	47.1	0.5555	0.1277_{25}	7.827_{157}	200
201	$11900._{249}$	204.0	667.8	463.8	416.7	47.1	0.5577	0.1252_{24}	7.984_{159}	201
202	$12158._{253}$	205.0	668.1	463.1	415.9	47.2	0.5599	0.1228_{24}	8.143_{162}	202
203	$12411._{257}$	206.1	668.4	462.3	415.1	47.2	0.5621	0.1204_{23}	8.305_{165}	203
204	$12668._{262}$	207.1	668.7	461.6	414.4	47.2	0.5643	0.1181_{23}	8.470_{169}	204
205	$12930._{265}$	208.2	669.0	460.8	413.5	47.3	0.5665	0.1158_{23}	8.639_{171}	205
206	$13195._{270}$	209.2	669.3	460.1	412.8	47.3	0.5687	0.1135_{22}	8.810_{174}	206
207	$13465._{274}$	210.3	669.6	459.3	412.0	47.3	0.5709	0.1113_{21}	8.984_{176}	207
208	$13739._{279}$	211.3	669.9	458.6	411.3	47.3	0.5731	0.1092_{21}	9.160_{178}	208
209	$14018._{283}$	212.4	670.2	457.8	410.4	47.4	0.5752	0.1071_{21}	9.338_{181}	209
210	$14301._{287}$	213.4	670.6	457.2	409.8	47.4	0.5774	0.1050_{20}	9.519_{185}	210
211	$14588._{292}$	214.5	670.9	456.4	409.0	47.4	0.5795	0.1030_{19}	9.704_{190}	211
212	$14880._{297}$	215.5	671.2	455.7	408.3	47.4	0.5817	0.1011_{19}	9.894_{186}	212
213	$15177._{301}$	216.5	671.5	455.0	407.6	47.4	0.5839	0.0992_{19}	10.08_{20}	213
214	$15478._{307}$	217.6	671.8	454.2	406.7	47.5	0.5860	0.0973_{19}	10.28_{20}	214
215	$15785._{311}$	218.6	672.1	453.5	406.0	47.5	0.5881	0.0954_{18}	10.48_{21}	215
216	$16096._{315}$	219.7	672.4	452.7	405.2	47.5	0.5903	0.0936_{18}	10.68_{22}	216
217	$16411._{321}$	220.7	672.7	452.0	404.5	47.5	0.5924	0.0918_{17}	10.89_{21}	217
218	$16732._{326}$	221.8	673.0	451.2	403.7	47.5	0.5945	0.0901_{17}	11.10_{21}	218
219	$17058._{331}$	222.8	673.3	450.5	403.0	47.5	0.5967	0.0884_{16}	11.31_{22}	219
220	17389.	223.9	673.6	449.7	402.2	47.5	0.5988	0.0868	11.53	220

TABLE IV.

SATURATED VAPOR OF ETHER

FRENCH UNITS.

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos., of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	184.39	0.00	94.00	94.00	86.45	7.55	0.0000	1.278	0.782	0
10	286.83	5.32	98.44	93.12	85.37	7.75	0.01909	0.8440	1.185	10
20	432.78	10.70	102.78	92.08	84.13	7.95	0.03772	0.5741	1.742	20
30	634.80	16.14	107.00	90.86	82.72	8.14	0.05563	0.4013	2.492	30
40	907.04	21.63	111.11	89.48	81.15	8.33	0.07374	0.2877	3.746	40
50	1264.8	27.19	115.11	87.92	79.41	8.51	0.09117	0.2108	4.744	50
60	1725.0	32.80	119.00	86.20	77.53	8.67	0.1083	0.1580	6.329	60
70	2304.9	38.48	122.78	84.30	75.49	8.81	0.1250	0.1203	8.313	70
80	3022.8	44.21	126.44	82.23	73.32	8.91	0.1415	0.0932	10.73	80
90	3898.3	50.00	130.00	80.00	71.03	8.97	0.1576	0.0731	13.68	90
100	4953.3	55.86	133.44	77.58	68.62	8.96	0.1735	0.0577	17.33	100
110	6214.6	61.77	136.78	75.01	66.13	8.88	0.1891	0.0459	21.79	110
120	7719.2	67.74	140.00	72.26	63.57	8.69	0.2045	0.0364	27.47	120

TABLE V.

SATURATED VAPOR OF ALCOHOL.

FRENCH UNITS.

Temperature, Degrees Centi-grade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\mu$	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centi-grade. t
0	12.70	0.00	236.5	236.50	223.38	13.12	0.0000	32.21	0.03105	0
10	24.23	5.59	244.4	238.81	225.29	13.52	0.01996	17.39	0.05750	10
20	44.46	11.42	252.0	240.58	226.56	14.02	0.04003	9.847	0.1016	20
30	78.52	17.49	258.0	240.51	226.03	14.48	0.06029	5.753	0.1738	30
40	133.69	23.71	262.0	238.29	223.44	14.85	0.08073	3.465	0.2886	40
50	219.90	30.21	264.0	233.79	218.59	15.10	0.1014	2.143	0.4666	50
60	350.21	37.37	265.0	227.63	212.38	15.25	0.1223	1.359	0.7358	60
70	541.15	44.58	265.2	220.62	205.28	15.34	0.1435	0.8855	1.129	70
80	812.91	52.11	265.2	213.09	197.69	15.40	0.1650	0.5921	1.689	80
90	1189.3	59.97	266.0	206.03	190.54	15.49	0.1868	0.4073	2.455	90
100	1697.6	68.18	267.3	199.12	183.54	15.58	0.2090	0.2874	3.479	100
110	2367.6	76.74	269.6	192.86	177.15	15.71	0.2315	0.2083	4.801	110
120	3231.7	85.67	272.5	186.83	170.97	15.86	0.2544	0.1544	6.477	120
130	4323.0	94.98	276.0	181.02	164.99	16.03	0.2776	0.1170	8.547	130
140	5674.6	104.70	280.5	175.80	159.55	16.25	0.3013	0.0905	11.05	140
150	7318.4	114.82	285.3	170.48	154.03	16.45	0.3254	0.0714	14.01	150

TABLE VI.

SATURATED VAPOR OF CHLOROFORM.

FRENCH UNITS.

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\omega$	Entropy of the Liquid. $\int\frac{dt}{T}$	Specific Volume. s	Density. Weight, in Kilos., of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	59.72	0.00	67.00	67.00	62.45	4.55	0.00000	2.377	0.4207	0
10	100.47	2.33	68.38	66.04	61.29	4.75	0.00836	1.475	0.6780	10
20	160.47	4.67	69.75	65.08	60.14	4.94	0.01646	0.9661	1.042	20
30	247.51	7.02	71.12	64.10	59.00	5.10	0.02432	0.6437	1.554	30
40	369.26	9.37	72.50	63.13	57.87	5.26	0.03196	0.4449	2.248	40
50	535.05	11.74	73.87	62.13	56.73	5.40	0.03940	0.3155	3.170	50
60	755.44	14.12	75.25	61.13	55.60	5.53	0.04664	0.2291	4.356	60
70	1042.1	16.51	76.62	60.11	54.45	5.66	0.05369	0.1710	5.88	70
80	1407.6	18.91	78.00	59.09	53.31	5.78	0.06057	0.1286	7.78	80
90	1865.2	21.32	79.37	58.05	52.16	5.89	0.06729	0.0991	10.09	90
100	2428.5	23.74	80.75	57.01	51.01	6.00	0.07386	0.0777	12.87	100
110	3111.0	26.17	82.12	55.95	49.84	6.11	0.08027	0.0618	16.18	110
120	3925.7	28.61	83.50	54.89	48.67	6.22	0.08655	0.0500	20.00	120
130	4885.1	31.06	84.87	53.81	47.48	6.33	0.09270	0.0410	24.39	130
140	6000.2	33.52	86.25	52.73	46.30	6.43	0.09872	0.0340	29.4	140
150	7280.6	35.99	87.62	51.63	45.10	6.53	0.10462	0.0286	35.0	150
160	8734.2	38.47	89.00	50.53	43.90	6.63	0.11041	0.0243	41.2	160

TABLE VII.

SATURATED VAPOR OF CARBON BISULPHIDE.

FRENCH UNITS.

Temperature, Degrees Centigrade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\mu$	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centigrade. t
0	127.91	0.00	90.00	90.00	82.76	7.24	0.00000	1.766	0.5662	**0**
10	198.46	2.36	91.42	89.06	81.58	7.48	0.00847	1.177	0.8496	**10**
20	298.03	4.74	92.76	88.02	80.31	7.71	0.01670	0.8071	1.239	**20**
30	434.62	7.13	94.01	86.88	78.97	7.91	0.02472	0.5684	1.759	**30**
40	617.53	9.54	95.18	85.64	77.54	8.10	0.03252	0.4098	2.440	**40**
50	857.07	11.96	96.27	84.31	76.04	8.27	0.04013	0.3017	3.315	**50**
60	1164.5	14.41	97.28	82.87	74.45	8.42	0.04756	0.2264	4.417	**60**
70	1552.1	16.86	98.20	81.34	72.78	8.56	0.05482	0.1726	5.794	**70**
80	2032.5	19.34	99.04	79.70	71.03	8.67	0.06192	0.1338	7.473	**80**
90	2619.1	21.83	99.80	77.97	69.20	8.77	0.06886	0.1052	9.51	**90**
100	3325.2	24.34	100.48	76.14	67.29	8.85	0.07566	0.0837	11.95	**100**
110	4164.1	26.86	101.07	74.21	65.31	8.90	0.08233	0.0674	14.84	**110**
120	5148.8	29.40	101.58	72.18	63.24	8.94	0.08886	0.0549	18.21	**120**
130	6291.6	31.96	102.01	70.05	61.09	8.96	0.09527	0.0452	22.12	**130**
140	7604.0	34.53	102.36	67.83	58.88	8.95	0.10157	0.0375	26.7	**140**
150	9095.9	37.12	102.62	65.50	56.58	8.92	0.10775	0.0314	31.8	**150**

TABLE VIII.

SATURATED VAPOR OF CARBON TETRACHLORIDE

FRENCH UNITS.

Temperature, Degrees Centi grade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. Apw	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centi grade. t
0	32.95	0.00	52.00	52.00	48.54	3.46	0.00000	3.272	0.3056	0
10	55.97	1.99	53.44	51.45	47.85	3.60	0.00714	2.005	0.4987	10
20	90.99	3.99	54.86	50.87	47.13	3.74	0.01400	1.283	0.7794	20
30	142.27	6.02	56.23	50.21	46.33	3.88	0.02087	0.8510	1.175	30
40	214.81	8.06	57.58	49.52	45.51	4.01	0.02749	0.5831	1.715	40
50	314.38	10.12	58.88	48.76	44.62	4.14	0.03396	0.4109	2.434	50
60	447.43	12.20	60.16	47.96	43.69	4.25	0.04028	0.2969	3.368	60
70	621.15	14.30	61.40	47.10	42.75	4.35	0.04648	0.2192	4.562	70
80	843.29	16.42	62.60	46.18	41.74	4.44	0.04255	0.1650	6.061	80
90	1122.3	18.55	63.77	45.22	40.50	4.72	0.05849	0.1263	7.92	90
100	1467.1	20.70	64.90	44.20	39.62	4.58	0.06433	0.0980	10.20	100
110	1887.4	22.87	66.01	43.14	38.52	4.62	0.07006	0.0770	12.99	110
120	2393.7	25.06	67.07	42.01	37.36	4.65	0.07569	0.0611	16.37	120
130	2996.9	27.27	68.10	40.83	36.18	4.65	0.08122	0.0490	20.41	130
140	3709.0	29.49	69.10	39.61	34.95	4.63	0.08666	0.0395	25.3	140
150	4543.1	31.73	70.07	38.34	33.75	4.59	0.09201	0.0321	31.2	150
160	5513.1	34.00	71.00	37.00	32.47	4.53	0.09729	0.0262	38.2	160

TABLE IX.

SATURATED VAPOR OF ACETON.

FRENCH UNITS.

Temperature, Degrees Centi-grade. t	Pressure, Millimeters of Mercury. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\mu$	Entropy of the Liquid. $\int \frac{cdt}{T}$	Specific Volume. s	Density. Weight, in Kilos, of one Cubic Meter. γ	Temperature, Degrees Centi-grade. t
0	63.33	0.00	140.50	140.50	131.82	8.68	0.00000	4.275	0.2339	0
10	110.32	5.10	144.11	139.01	129.51	9.50	0.01832	2.686	0.3723	10
20	180.08	10.29	147.62	137.33	127.16	10.17	0.03627	1.758	0.5688	20
30	280.05	15.55	151.03	135.48	124.83	10.65	0.05389	1.187	0.8425	30
40	419.35	20.89	154.33	133.44	121.39	11.05	0.07119	0.8227	1.215	40
50	608.81	26.31	157.53	131.22	119.86	11.36	0.08820	0.5830	1.715	50
60	860.96	31.81	160.63	128.82	117.22	11.60	0.1049	0.4215	2.372	60
70	1189.9	37.39	163.62	126.23	114.43	11.80	0.1214	0.3106	3.220	70
80	1611.1	43.05	166.51	123.46	111.49	11.97	0.1376	0.2328	4.296	80
90	2140.8	48.79	169.30	120.51	108.41	12.10	0.1536	0.1773	5.640	90
100	2796.2	54.61	171.98	117.37	105.17	12.20	0.1694	0.1372	7.289	100
110	3594.3	60.50	174.56	114.06	101.78	12.28	0.1850	0.1076	9.294	110
120	4552.0	66.48	177.04	110.56	98.23	12.33	0.2004	0.0856	11.68	120
130	5684.9	72.54	179.42	106.88	94.53	12.35	0.2156	0.0689	14.51	130
140	7007.6	78.67	181.69	103.02	90.67	12.35	0.2306	0.0561	17.83	140

TABLE X.

SATURATED VAPOR OF AMMONIA.

ENGLISH UNITS.

Temperature, Degrees Fahrenheit. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap\alpha$	Entropy of the Liquid. $\int \frac{dq}{T}$	Specific Volume. v	Density. Weight, in pounds, of one Cubic Foot. γ	Temperature, Degrees Fahrenheit. t
−40	9.93	−79	519	598	550	48	−0.1737	26.1	0.0383	−40
−35	11.53	−74	520	594	546	48	−0.1607	22.6	0.0442	−35
−30	13.36	−68	522	590	541	49	−0.1482	19.7	0.0507	−30
−25	15.40	−63	523	586	537	49	−0.1354	17.3	0.0580	−25
−20	17.70	−57	525	582	532	50	−0.1229	15.2	0.0660	−20
−15	20.25	−52	526	578	528	50	−0.1102	13.3	0.0750	−15
−10	23.10	−46	528	574	524	50	−0.0982	11.8	0.0848	−10
−5	26.25	−41	529	570	519	51	−0.0859	10.5	0.0956	−5
0	29.74	−35	531	566	515	51	−0.0738	9.32	0.108	0
5	33.58	−30	532	562	511	51	−0.0619	8.31	0.120	5
10	37.80	−24	534	558	506	52	−0.0501	7.44	0.134	10
15	42.43	−19	535	554	502	52	−0.0386	6.68	0.150	15
20	47.49	−13	537	550	497	53	−0.0271	6.02	0.166	20
25	53.01	−8	538	546	493	53	−0.0157	5.43	0.184	25
30	59.01	−2	540	542	489	53	−0.0044	4.92	0.203	30
35	65.53	3	541	538	484	54	0.0067	4.46	0.225	35
40	72.59	9	543	534	480	54	0.0177	4.06	0.247	40
45	80.21	14	544	530	475	55	0.0287	3.70	0.270	45
50	88.44	20	546	526	471	55	0.0395	3.38	0.296	50
55	97.30	25	547	522	467	55	0.0502	3.09	0.323	55
60	106.82	31	549	518	462	56	0.0608	2.84	0.352	60
65	117.04	36	550	514	458	56	0.0713	2.61	0.383	65
70	127.98	42	552	510	454	56	0.0817	2.40	0.416	70
75	139.67	47	553	506	449	57	0.0921	2.22	0.451	75
80	152.15	53	555	502	445	57	0.1023	2.05	0.488	80
85	165.47	58	556	498	441	57	0.1124	1.90	0.527	85
90	179.64	64	558	494	436	58	0.1224	1.76	0.568	90
95	194.70	69	559	490	432	58	0.1324	1.63	0 612	95
100	210.70	75	561	486	428	58	0.1423	1.52	0.657	100

TABLE XI.

SATURATED VAPOR OF SULPHUR DIOXIDE.

ENGLISH UNITS.

Temperature, Degrees Fahrenheit. t	Pressure, Pounds per Square Inch. p	Heat of the Liquid. q	Total Heat. λ	Heat of Vaporization. r	Heat equivalent of Internal Work. ρ	Heat equivalent of External Work. $Ap u$	Entropy of the Liquid. $\int \frac{x dt}{T}$	Specific Volume. s	Density. Weight, in pounds, of one Cubic Foot. γ	Temperature, Degrees Fahrenheit. t
−40	3.14	−29	166	195	182	13	−0.0632	23.0	0.0434	−40
−35	3.70	−27	167	194	180	14	−0.0584	19.7	0.0507	−35
−30	4.34	−25	168	193	179	14	−0.0539	17.0	0.0590	−30
−25	5.07	−23	168	191	177	14	−0.0492	14.7	0.0682	−25
−20	5.90	−21	169	190	176	14	−0.0447	12.7	0.0785	−20
−15	6.83	−19	170	189	175	14	−0.0401	11.1	0.0901	−15
−10	7.88	−17	170	187	173	14	−0.0357	9.73	0.103	−10
−5	9.05	−15	171	186	172	14	−0.0312	8.56	0.117	−5
0	10.35	−13	172	185	170	15	−0.0268	7.54	0.133	0
5	11.81	−11	172	183	168	15	−0.0225	6.67	0.150	5
10	13.41	−9	173	182	167	15	−0.0182	5.93	0.169	10
15	15.19	−7	174	181	166	15	−0.0140	5.29	0.189	15
20	17.15	−5	174	179	164	15	−0.0098	4 72	0.212	20
25	19.30	−3	175	178	163	15	−0.0057	4.23	0.236	25
30	21.66	−1	176	177	162	15	−0.0016	3.81	0.263	30
35	24.24	1	176	175	160	15	0.0024	3.43	0.291	35
40	27.06	3	177	174	158	16	0.0064	3.10	0.322	40
45	30.12	5	177	172	156	16	0.0104	2.81	0.356	45
50	33.45	7	178	171	155	16	0.0144	2.58	0.390	50
55	37.07	9	179	170	154	16	0.0182	2.32	0.430	55
60	40.98	11	179	168	152	16	0.0221	2.11	0.473	60
65	45.20	13	180	167	151	16	0.0259	1.94	0.516	65
70	49.75	15	181	166	150	16	0.0297	1.78	0.563	70
75	54.64	17	181	164	148	16	0.0334	1.63	0.614	75
80	59.90	19	182	163	146	17	0.0372	1.50	0.668	80
85	65.54	21	183	162	145	17	0.0409	1.38	0.725	85
90	71.57	23	183	160	143	17	0.0445	1.27	0.786	90
95	78.02	25	184	159	142	17	0.0482	1.18	0.849	95
100	84.90	27	185	158	141	17	0.0518	1.09	0.917	100

TABLE XII.

SPECIFIC GRAVITY AND SPECIFIC VOLUME OF LIQUIDS.

Name of Liquid.	Specific Gravity, compared with Water at 4° C.	Specific Volume. Cubic Meters per Kilo.
Alcohol, C_2H_6O	0.80625 [Mendelejeff, 1869]	0.001240
Ether, $C_4H_{10}O$	0.736 [Kopp, 1840]	0.001358
Chloroform	1.527 [Thorpe, 1880]	0.000655
Carbon bisulphide, CS_2 . . .	1.2922 [Thorpe, 1880]	0.000774
Carbon tetrachloride, CCl_4 . .	1.6320 [Thorpe, 1880]	0.000613
Aceton, C_3H_6O	0.81 [Zander, 1882]	0.00123
Sulphur Dioxide SO_2	1.4336 [Andréeff, 1859]	0.0006981
Ammonia NH_3	0.6364 [Andréeff, 1859]	0.001571

TABLE XIII.

VOLUME OF WATER.

Vol. at 4° C=1.

[Rossetti, 1871] and [Hirn, 1867.]

Temperature.	Volume.	Temperature.	Volume.	Temperature.	Volume.	Temperature.	Volume.
10	1.000253	60	1.01691	110	1.0512	160	1.1018
20	1.001744	70	1.02256	120	1.0599	170	1.1139
30	1.00425	80	1.02887	130	1.0694	180	1.1268
40	1.00770	90	1.03567	140	1.0795	190	1.1403
50	1.01195	100	1.04312	150	1.0903	200	1.1544

NAPERIAN LOGARITHMS.

$e = 2.7182818 \quad \log e = 0.4342945 = M$

	0	1	2	3	4	5	6	7	8	9
1.0	0.0000	0.00995	0.01980	0.02956	0.03922	0.04879	0.05827	0.06766	0.07696	0.08618
1.1	0.09531	0.1044	0.1133	0.1222	0.1310	0.1398	0.1484	0.1570	0.1655	0.1739
1.2	0.1823	0.1906	0.1988	0.2070	0.2151	0.2231	0.2311	0.2390	0.2469	0.2546
1.3	0.2624	0.2700	0.2776	0.2852	0.2927	0.3001	0.3075	0.3148	0.3221	0.3293
1.4	0.3365	0.3436	0.3507	0.3577	0.3646	0.3716	0.3784	0.3853	0.3920	0.3988
1.5	0.4055	0.4121	0.4187	0.4253	0.4318	0.4382	0.4447	0.4511	0.4574	0.4637
1.6	0.4700	0.4762	0.4824	0.4886	0.4947	0.5008	0.5068	0.5128	0.5188	0.5247
1.7	0.5306	0.5365	0.5423	0.5481	0.5539	0.5596	0.5653	0.5710	0.5766	0.5822
1.8	0.5878	0.5933	0.5988	0.6043	0.6098	0.6152	0.6206	0.6259	0.6313	0.6366
1.9	0.6418	0.6471	0.6523	0.6575	0.6627	0.6678	0.6729	0.6780	0.6831	0.6881
2.0	0.6931	0.6981	0.7031	0.7080	0.7129	0.7178	0.7227	0.7275	0.7324	0.7372
2.1	0.7419	0.7467	0.7514	0.7561	0.7608	0.7655	0.7701	0.7747	0.7793	0.7839
2.2	0.7884	0.7930	0.7975	0.8020	0.8065	0.8109	0.8154	0.8198	0.8242	0.8286
2.3	0.8329	0.8372	0.8416	0.8459	0.8502	0.8544	0.8587	0.8629	0.8671	0.8713
2.4	0.8755	0.8796	0.8838	0.8879	0.8920	0.8961	0.9002	0.9042	0.9083	0.9123
2.5	0.9163	0.9203	0.9243	0.9282	0.9322	0.9361	0.9400	0.9439	0.9478	0.9517
2.6	0.9555	0.9594	0.9632	0.9670	0.9708	0.9746	0.9783	0.9821	0.9858	0.9895
2.7	0.9933	0.9969	1.0006	1.0043	1.0080	1.0116	1.0152	1.0188	1.0225	1.0260
2.8	1.0296	1.0332	1.0367	1.0403	1.0438	1.0473	1.0508	1.0543	1.0578	1.0613
2.9	1.0647	1.0682	1.0716	1.0750	1.0784	1.0818	1.0852	1.0886	1.0919	1.0953
3.0	1.0986	1.1019	1.1053	1.1086	1.1119	1.1151	1.1184	1.1217	1.1249	1.1282
3.1	1.1314	1.1346	1.1378	1.1410	1.1442	1.1474	1.1506	1.1537	1.1569	1.1600
3.2	1.1632	1.1663	1.1694	1.1725	1.1756	1.1787	1.1817	1.1848	1.1878	1.1909
3.3	1.1939	1.1969	1.2000	1.2030	1.2060	1.2090	1.2119	1.2149	1.2179	1.2208
3.4	1.2238	1.2267	1.2296	1.2326	1.2355	1.2384	1.2413	1.2442	1.2470	1.2499
3.5	1.2528	1.2556	1.2585	1.2613	1.2641	1.2669	1.2698	1.2726	1.2754	1.2782
3.6	1.2809	1.2837	1.2865	1.2892	1.2920	1.2947	1.2975	1.3002	1.3029	1.3056
3.7	1.3083	1.3110	1.3137	1.3164	1.3191	1.3218	1.3244	1.3271	1.3297	1.3324
3.8	1.3350	1.3376	1.3403	1.3429	1.3455	1.3481	1.3507	1.3533	1.3558	1.3584
3.9	1.3610	1.3635	1.3661	1.3686	1.3712	1.3737	1.3762	1.3788	1.3813	1.3838
4.0	1.3863	1.3888	1.3913	1.3938	1.3962	1.3987	1.4012	1.4036	1.4061	1.4085
4.1	1.4110	1.4134	1.4159	1.4183	1.4207	1.4231	1.4255	1.4279	1.4303	1.4327
4.2	1.4351	1.4375	1.4398	1.4422	1.4446	1.4469	1.4493	1.4516	1.4540	1.4563
4.3	1.4586	1.4609	1.4633	1.4656	1.4679	1.4702	1.4725	1.4748	1.4770	1.4793
4.4	1.4816	1.4839	1.4861	1.4884	1.4907	1.4929	1.4951	1.4974	1.4996	1.5019
4.5	1.5041	1.5063	1.5085	1.5107	1.5129	1.5151	1.5173	1.5195	1.5217	1.5239
4.6	1.5261	1.5282	1.5304	1.5326	1.5347	1.5369	1.5390	1.5412	1.5433	1.5454
4.7	1.5476	1.5497	1.5518	1.5539	1.5560	1.5581	1.5602	1.5623	1.5644	1.5665
4.8	1.5686	1.5707	1.5728	1.5748	1.5769	1.5790	1.5810	1.5831	1.5851	1.5872
4.9	1.5892	1.5913	1.5933	1.5953	1.5974	1.5994	1.6014	1.6034	1.6054	1.6074
5.0	1.6094	1.6114	1.6134	1.6154	1.6174	1.6194	1.6214	1.6233	1.6253	1.6273
5.1	1.6292	1.6312	1.6332	1.6351	1.6371	1.6390	1.6409	1.6429	1.6448	1.6467
5.2	1.6487	1.6506	1.6525	1.6544	1.6563	1.6582	1.6601	1.6620	1.6639	1.6658
5.3	1.6677	1.6696	1.6715	1.6734	1.6752	1.6771	1.6790	1.6808	1.6827	1.6845
5.4	1.6864	1.6882	1.6901	1.6919	1.6938	1.6956	1.6974	1.6993	1.7011	1.7029
5.5	1.7047	1.7066	1.7084	1.7102	1.7120	1.7138	1.7156	1.7174	1.7192	1.7210
5.6	1.7228	1.7246	1.7263	1.7281	1.7299	1.7317	1.7334	1.7352	1.7370	1.7387

	0	1	2	3	4	5	6	7	8	9
5.7	1.7405	1.7422	1.7440	1.7457	1.7475	1.7492	1.7509	1.7527	1.7544	1.7561
5.8	1.7579	1.7596	1.7613	1.7630	1.7647	1.7664	1.7681	1.7699	1.7716	1.7733
5.9	1.7750	1.7766	1.7783	1.7800	1.7817	1.7834	1.7851	1.7867	1.7884	1.7901
6.0	1.7918	1.7934	1.7951	1.7967	1.7984	1.8001	1.8017	1.8034	1.8050	1.8066
6.1	1.8083	1.8099	1.8116	1.8132	1.8148	1.8165	1.8181	1.8197	1.8213	1.8229
6.2	1.8245	1.8262	1.8278	1.8294	1.8310	1.8326	1.8342	1.8358	1.8374	1.8390
6.3	1.8405	1.8421	1.8437	1.8453	1.8469	1.8485	1.8500	1.8516	1.8532	1.8547
6.4	1.8563	1.8579	1.8594	1.8610	1.8625	1.8641	1.8656	1.8672	1.8687	1.8703
6.5	1.8718	1.8733	1.8749	1.8764	1.8779	1.8795	1.8810	1.8825	1.8840	1.8856
6.6	1.8871	1.8886	1.8901	1.8916	1.8931	1.8946	1.8961	1.8976	1.8991	1.9006
6.7	1.9021	1.9036	1.9051	1.9066	1.9081	1.9095	1.9110	1.9125	1.9140	1.9155
6.8	1.9169	1.9184	1.9199	1.9213	1.9228	1.9242	1.9257	1.9272	1.9286	1.9301
6.9	1.9315	1.9330	1.9344	1.9359	1.9373	1.9387	1.9402	1.9416	1.9430	1.9445
7.0	1.9459	1.9473	1.9488	1.9502	1.9516	1.9530	1.9544	1.9559	1.9573	1.9587
7.1	1.9601	1.9615	1.9629	1.9643	1.9657	1.9671	1.9685	1.9699	1.9713	1.9727
7.2	1.9741	1.9755	1.9769	1.9782	1.9796	1.9810	1.9824	1.9838	1.9851	1.9865
7.3	1.9879	1.9892	1.9906	1.9920	1.9933	1.9947	1.9961	1.9974	1.9988	2.0001
7.4	2.0015	2.0028	2.0042	2.0055	2.0069	2.0082	2.0096	2.0109	2.0122	2.0136
7.5	2.0149	2.0162	2.0176	2.0189	2.0202	2.0215	2.0229	2.0242	2.0255	2.0268
7.6	2.0281	2.0295	2.0308	2.0321	2.0334	2.0347	2.0360	2.0373	2.0386	2.0399
7.7	2.0412	2.0425	2.0438	2.0451	2.0464	2.0477	2.0490	2.0503	2.0516	2.0528
7.8	2.0541	2.0554	2.0567	2.0580	2.0592	2.0605	2.0618	2.0631	2.0643	2.0656
7.9	2.0668	2.0681	2.0694	2.0707	2.0719	2.0732	2.0744	2.0757	2.0769	2.0782
8.0	2.0794	2.0807	2.0819	2.0832	2.0844	2.0857	2.0869	2.0881	2.0894	2.0906
8.1	2.0919	2.0931	2.0943	2.0956	2.0968	2.0980	2.0992	2.1005	2.1017	2.1029
8.2	2.1041	2.1054	2.1066	2.1078	2.1090	2.1102	2.1114	2.1126	2.1138	2.1150
8.3	2.1163	2.1175	2.1187	2.1199	2.1211	2.1223	2.1235	2.1247	2.1258	2.1270
8.4	2.1282	2.1294	2.1306	2.1318	2.1330	2.1342	2.1353	2.1365	2.1377	2.1389
8.5	2.1401	2.1412	2.1424	2.1436	2.1448	2.1459	2.1471	2.1483	2.1494	2.1506
8.6	2.1518	2.1529	2.1541	2.1552	2.1564	2.1576	2.1587	2.1599	2.1610	2.1622
8.7	2.1633	2.1645	2.1656	2.1668	2.1679	2.1691	2.1702	2.1713	2.1725	2.1736
8.8	2.1748	2.1759	2.1770	2.1782	2.1793	2.1804	2.1815	2.1827	2.1838	2.1849
8.9	2.1861	2.1872	2.1883	2.1894	2.1905	2.1917	2.1928	2.1939	2.1950	2.1961
9.0	2.1972	2.1983	2.1994	2.2006	2.2017	2.2028	2.2039	2.2050	2.2061	2.2072
9.1	2.2083	2.2094	2.2105	2.2116	2.2127	2.2138	2.2148	2.2159	2.2170	2.2181
9.2	2.2192	2.2203	2.2214	2.2225	2.2235	2.2246	2.2257	2.2268	2.2279	2.2289
9.3	2.2300	2.2311	2.2322	2.2332	2.2343	2.2354	2.2364	2.2375	2.2386	2.2396
9.4	2.2407	2.2418	2.2428	2.2439	2.2450	2.2460	2.2471	2.2481	2.2492	2.2502
9.5	2.2513	2.2523	2.2534	2.2544	2.2555	2.2565	2.2576	2.2586	2.2597	2.2607
9.6	2.2618	2.2628	2.2638	2.2649	2.2659	2.2670	2.2680	2.2690	2.2701	2.2711
9.7	2.2721	2.2732	2.2742	2.2752	2.2762	2.2773	2.2783	2.2793	2.2803	2.2814
9.8	2.2824	2.2834	2.2844	2.2854	2.2865	2.2875	2.2885	2.2895	2.2905	2.2915
9.9	2.2925	2.2935	2.2946	2.2956	2.2966	2.2976	2.2986	2.2996	2.3006	2.3016
10.0	2.3026									

SHORT-TITLE CATALOGUE

OF THE

PUBLICATIONS

OF

JOHN WILEY & SONS,

NEW YORK.

LONDON: CHAPMAN & HALL, LIMITED.

ARRANGED UNDER SUBJECTS.

Descriptive circulars sent on application. Books marked with an asterisk (*) are sold at *net* prices only. a double asterisk (**) books sold under the rules of the American Publishers' Association at *net* prices subject to an extra charge for postage. All books are bound in cloth unless otherwise stated.

AGRICULTURE.

Armsby's Manual of Cattle-feeding	12mo,	$1 75
Principles of Animal Nutrition	8vo,	4 00
Budd and Hansen's American Horticultural Manual:		
Part I. Propagation, Culture, and Improvement	12mo,	1 50
Part II. Systematic Pomology	12mo,	1 50
Downing's Fruits and Fruit-trees of America	8vo,	5 00
Elliott's Engineering for Land Drainage	12mo,	1 50
Practical Farm Drainage	12mo,	1 00
Green's Principles of American Forestry	12mo,	1 50
Grotenfelt's Principles of Modern Dairy Practice. (Woll.)	12mo,	2 00
Kemp's Landscape Gardening	12mo,	2 50
Maynard's Landscape Gardening as Applied to Home Decoration	12mo,	1 50
Sanderson's Insects Injurious to Staple Crops	12mo,	1 50
Insects Injurious to Garden Crops. (In preparation.)		
Insects Injuring Fruits. (In preparation.)		
Stockbridge's Rocks and Soils	8vo,	2 50
Woll's Handbook for Farmers and Dairymen	16mo,	1 50

ARCHITECTURE.

Baldwin's Steam Heating for Buildings	12mo,	2 50
Bashore's Sanitation of a Country House	12mo,	1 00
Berg's Buildings and Structures of American Railroads	4to,	5 00
Birkmire's Planning and Construction of American Theatres	8vo,	3 00
Architectural Iron and Steel	8vo,	3 50
Compound Riveted Girders as Applied in Buildings	8vo,	2 00
Planning and Construction of High Office Buildings	8vo	3 50
Skeleton Construction in Buildings	8vo,	3 00
Briggs's Modern American School Buildings	8vo,	4 00
Carpenter's Heating and Ventilating of Buildings	8vo,	4 00
Freitag's Architectural Engineering	8vo,	3 50
Fireproofing of Steel Buildings	8vo,	2 50
French and Ives's Stereotomy	8vo,	2 50
Gerhard's Guide to Sanitary House-inspection	16mo,	1 00
Theatre Fires and Panics	12mo,	1 50
Holly's Carpenters' and Joiners' Handbook	18mo,	75
Johnson's Statics by Algebraic and Graphic Methods	8vo,	2 00

Kidder's Architects' and Builders' Pocket-book. Rewritten Edition. 16mo, mor., 5 00
Merrill's Stones for Building and Decoration. 8vo, 5 00
Non-metallic Minerals: Their Occurrence and Uses. 8vo, 4 00
Monckton's Stair-building. 4to, 4 00
Patton's Practical Treatise on Foundations. 8vo, 5 00
Peabody's Naval Architecture. 8vo, 7 50
Richey's Handbook for Superintendents of Construction. 16mo, mor., 4 00
Sabin's Industrial and Artistic Technology of Paints and Varnish. 8vo, 3 00
Siebert and Biggin's Modern Stone-cutting and Masonry. 8vo, 1 50
Snow's Principal Species of Wood. 8vo, 3 50
Sondericker's Graphic Statics with Applications to Trusses, Beams, and Arches. 8vo, 2 00
Towne's Locks and Builders' Hardware. 18mo, morocco, 3 00
Wait's Engineering and Architectural Jurisprudence. 8vo, 6 00
Sheep, 6 50
Law of Operations Preliminary to Construction in Engineering and Architecture. 8vo, 5 00
Sheep, 5 50
Law of Contracts. 8vo, 3 00
Wood's Rustless Coatings: Corrosion and Electrolysis of Iron and Steel. 8vo, 4 00
Woodbury's Fire Protection of Mills. 8vo, 2 50
Worcester and Atkinson's Small Hospitals, Establishment and Maintenance, Suggestions for Hospital Architecture, with Plans for a Small Hospital. 12mo, 1 25
The World's Columbian Exposition of 1893. Large 4to, 1 00

ARMY AND NAVY.

Bernadou's Smokeless Powder, Nitro-cellulose, and the Theory of the Cellulose Molecule. 12mo, 2 50
* Bruff's Text-book Ordnance and Gunnery. 8vo, 6 00
Chase's Screw Propellers and Marine Propulsion. 8vo, 3 00
Cloke's Gunner's Examiner. 8vo, 1 50
Craig's Azimuth. 4to, 3 50
Crehore and Squier's Polarizing Photo-chronograph. 8vo, 3 00
Cronkhite's Gunnery for Non-commissioned Officers. 24mo, morocco, 2 00
* Davis's Elements of Law. 8vo, 2 50
* Treatise on the Military Law of United States. 8vo, 7 00
Sheep, 7 50
De Brack's Cavalry Outposts Duties. (Carr.) 24mo, morocco, 2 00
Dietz's Soldier's First Aid Handbook. 16mo, morocco, 1 25
* Dredge's Modern French Artillery. 4to, half morocco, 15 00
Durand's Resistance and Propulsion of Ships. 8vo, 5 00
* Dyer's Handbook of Light Artillery. 12mo, 3 00
Eissler's Modern High Explosives. 8vo, 4 00
* Fiebeger's Text-book on Field Fortification. Small 8vo, 2 00
Hamilton's The Gunner's Catechism. 18mo, 1 00
* Hoff's Elementary Naval Tactics. 8vo, 1 50
Ingalls's Handbook of Problems in Direct Fire. 8vo, 4 00
* Ballistic Tables. 8vo, 1 50
* Lyons's Treatise on Electromagnetic Phenomena. Vols. I. and II. 8vo, each, 6 00
* Mahan's Permanent Fortifications. (Mercur.) 8vo, half morocco, 7 50
Manual for Courts-martial. 16mo, morocco, 1 50
* Mercur's Attack of Fortified Places. 12mo, 2 00
* Elements of the Art of War. 8vo, 4 00
Metcalf's Cost of Manufactures—And the Administration of Workshops. 8vo, 5 00
* Ordnance and Gunnery. 2 vols. 12mo, 5 00
Murray's Infantry Drill Regulations. 18mo, paper, 10
Nixon's Adjutants' Manual. 24mo, 1 00
Peabody's Naval Architecture. 8vo, 7 50

* Phelps's Practical Marine Surveying	8vo,	3 50
Powell's Army Officer's Examiner	12mo,	4 00
Sharpe's Art of Subsisting Armies in War	18mo, morocco,	1 50
* Walke's Lectures on Explosives	8vo,	4 00
* Wheeler's Siege Operations and Military Mining	8vo,	2 00
Winthrop's Abridgment of Military Law	12mo,	3 50
Woodhull's Notes on Military Hygiene	16mo,	1 50
Young's Simple Elements of Navigation	16mo, morocco,	1 00
Second Edition, Enlarged and Revised	16mo, morocco,	2 00

ASSAYING.

Fletcher's Practical Instructions in Quantitative Assaying with the Blowpipe	12mo, morocco,	1 50
Furman's Manual of Practical Assaying	8vo,	3 00
Lodge's Notes on Assaying and Metallurgical Laboratory Experiments	8vo,	3 00
Miller's Manual of Assaying	12mo,	1 00
O'Driscoll's Notes on the Treatment of Gold Ores	8vo,	2 00
Ricketts and Miller's Notes on Assaying	8vo,	3 00
Ulke's Modern Electrolytic Copper Refining	8vo,	3 00
Wilson's Cyanide Processes	12mo,	1 50
Chlorination Process	12mo,	1 50

ASTRONOMY.

Comstock's Field Astronomy for Engineers	8vo,	2 50
Craig's Azimuth	4to,	3 50
Doolittle's Treatise on Practical Astronomy	8vo,	4 00
Gore's Elements of Geodesy	8vo,	2 50
Hayford's Text-book of Geodetic Astronomy	8vo,	3 00
Merriman's Elements of Precise Surveying and Geodesy	8vo,	2 50
* Michie and Harlow's Practical Astronomy	8vo,	3 00
* White's Elements of Theoretical and Descriptive Astronomy	12mo,	2 00

BOTANY.

Davenport's Statistical Methods, with Special Reference to Biological Variation	16mo, morocco,	1 25
Thomé and Bennett's Structural and Physiological Botany	16mo,	2 25
Westermaier's Compendium of General Botany. (Schneider.)	8vo,	2 00

CHEMISTRY.

Adriance's Laboratory Calculations and Specific Gravity Tables	12mo,	1 25
Allen's Tables for Iron Analysis	8vo,	3 00
Arnold's Compendium of Chemistry. (Mandel.)	Small 8vo,	3 50
Austen's Notes for Chemical Students	12mo,	1 50
Bernadou's Smokeless Powder.—Nitro-cellulose, and Theory of the Cellulose Molecule	12mo,	2 50
Bolton's Quantitative Analysis	8vo,	1 50
* Browning's Introduction to the Rarer Elements	8vo,	1 50
Brush and Penfield's Manual of Determinative Mineralogy	8vo,	4 00
Classen's Quantitative Chemical Analysis by Electrolysis. (Boltwood.)	8vo,	3 00
Cohn's Indicators and Test-papers	12mo,	2 00
Tests and Reagents	8vo,	3 00
Crafts's Short Course in Qualitative Chemical Analysis. (Schaeffer.)	12mo,	1 50
Dolezalek's Theory of the Lead Accumulator (Storage Battery). (Von Ende.)	12mo,	2 50
Drechsel's Chemical Reactions. (Merrill.)	12mo,	1 25
Duhem's Thermodynamics and Chemistry. (Burgess.)	8vo,	4 00
Eissler's Modern High Explosives	8vo,	4 00
Effront's Enzymes and their Applications. (Prescott.)	8vo,	3 00
Erdmann's Introduction to Chemical Preparations. (Dunlap.)	12mo,	1 25

Fletcher's Practical Instructions in Quantitative Assaying with the Blowpipe. 12mo, morocco, 1 50

Fowler's Sewage Works Analyses. 12mo, 2 00

Fresenius's Manual of Qualitative Chemical Analysis. (Wells.). 8vo, 5 00

Manual of Qualitative Chemical Analysis. Part I. Descriptive. (Wells.) 8vo, 3 00

System of Instruction in Quantitative Chemical Analysis. (Cohn.) 2 vols. 8vo, 12 50

Fuertes's Water and Public Health. 12mo, 1 50

Furman's Manual of Practical Assaying. 8vo, 3 00

* Getman's Exercises in Physical Chemistry. 12mo, 2 00

Gill's Gas and Fuel Analysis for Engineers. 12mo, 1 25

Grotenfelt's Principles of Modern Dairy Practice. (Woll.). 12mo, 2 00

Hammarsten's Text-book of Physiological Chemistry. (Mandel.) 8vo, 4 00

Helm's Principles of Mathematical Chemistry. (Morgan.). 12mo, 1 50

Hering's Ready Reference Tables (Conversion Factors). 16mo morocco, 2 50

Hind's Inorganic Chemistry. 8vo, 3 00

* Laboratory Manual for Students. 12mo, 1 00

Holleman's Text-book of Inorganic Chemistry. (Cooper.). 8vo, 2 50

Text-book of Organic Chemistry. (Walker and Mott.). 8vo, 2 50

* Laboratory Manual of Organic Chemistry. (Walker.). 12mo, 1 00

Hopkins's Oil-chemists' Handbook. 8vo, 3 00

Jackson's Directions for Laboratory Work in Physiological Chemistry. 8vo, 1 25

Keep's Cast Iron. 8vo, 2 50

Ladd's Manual of Quantitative Chemical Analysis. 12mo, 1 00

Landauer's Spectrum Analysis. (Tingle.). 8vo, 3 00

* Langworthy and Austen. The Occurrence of Aluminium in Vegetable Products, Animal Products, and Natural Waters. 8vo, 2 00

Lassar-Cohn's Practical Urinary Analysis. (Lorenz.). 12mo, 1 00

Application of Some General Reactions to Investigations in Organic Chemistry. (Tingle.). 12mo, 1 00

Leach's The Inspection and Analysis of Food with Special Reference to State Control. 8vo, 7 50

Löb's Electrolysis and Electrosynthesis of Organic Compounds. (Lorenz.). 12mo, 1 00

Lodge's Notes on Assaying and Metallurgical Laboratory Experiments. 8vo, 3 00

Lunge's Techno-chemical Analysis. (Cohn.). 12mo, 1 00

Mandel's Handbook for Bio-chemical Laboratory. 12mo, 1 50

* Martin's Laboratory Guide to Qualitative Analysis with the Blowpipe. 12mo, 60

Mason's Water-supply. (Considered Principally from a Sanitary Standpoint.) 3d Edition, Rewritten. 8vo, 4 00

Examination of Water. (Chemical and Bacteriological.). 12mo, 1 25

Matthew's The Textile Fibres. 8vo, 3 50

Meyer's Determination of Radicles in Carbon Compounds. (Tingle.). 12mo, 1 00

Miller's Manual of Assaying. 12mo, 1 00

Mixter's Elementary Text-book of Chemistry. 12mo, 1 50

Morgan's Outline of Theory of Solution and its Results. 12mo, 1 00

Elements of Physical Chemistry. 12mo, 2 00

Morse's Calculations used in Cane-sugar Factories. 16mo, morocco, 1 50

Mulliken's General Method for the Identification of Pure Organic Compounds. Vol. I. Large 8vo, 5 00

O'Brine's Laboratory Guide in Chemical Analysis. 8vo, 2 00

O'Driscoll's Notes on the Treatment of Gold Ores. 8vo, 2 00

Ostwald's Conversations on Chemistry. Part One. (Ramsey.). 12mo, 1 50

Ostwald's Conversations on Chemistry. Part Two. (Turnbull.). (In Press.)

* Penfield's Notes on Determinative Mineralogy and Record of Mineral Tests. 8vo, paper, 50

Pictet's The Alkaloids and their Chemical Constitution. (Biddle.). 8vo, 5 00

Pinner's Introduction to Organic Chemistry. (Austen.). 12mo, 1 50

Poole's Calorific Power of Fuels. 8vo, 3 00

Prescott and Winslow's Elements of Water Bacteriology, with Special Reference to Sanitary Water Analysis. 12mo, 1 25

* Reisig's Guide to Piece-dyeing 8vo, 25 00
Richards and Woodman's Air, Water, and Food from a Sanitary Standpoint 8vo, 2 00
Richards's Cost of Living as Modified by Sanitary Science 12mo, 1 00
Cost of Food, a Study in Dietaries 12mo, 1 00
* Richards and Williams's The Dietary Computer 8vo, 1 50
Ricketts and Russell's Skeleton Notes upon Inorganic Chemistry. (Part I. Non-metallic Elements.) ..... 8vo, morocco, 75
Ricketts and Miller's Notes on Assaying 8vo, 3 00
Rideal's Sewage and the Bacterial Purification of Sewage 8vo, 3 50
Disinfection and the Preservation of Food 8vo, 4 00
Rigg's Elementary Manual for the Chemical Laboratory 8vo, 1 25
Rostoski's Serum Diagnosis. (Bolduan.) 12mo, 1 00
Ruddiman's Incompatibilities in Prescriptions 8vo, 2 00
Sabin's Industrial and Artistic Technology of Paints and Varnish 8vo, 3 00
Salkowski's Physiological and Pathological Chemistry. (Orndorff.) 8vo, 2 50
Schimpf's Text-book of Volumetric Analysis 12mo, 2 50
Essentials of Volumetric Analysis 12mo, 1 25
Spencer's Handbook for Chemists of Beet-sugar Houses. 16mo, morocco, 3 00
Handbook for Sugar Manufacturers and their Chemists. 16mo, morocco, 2 00
Stockbridge's Rocks and Soils 8vo, 2 50
* Tillman's Elementary Lessons in Heat 8vo, 1 50
* Descriptive General Chemistry 8vo, 3 00
Treadwell's Qualitative Analysis. (Hall.) 8vo, 3 00
Quantitative Analysis. (Hall.) 8vo, 4 00
Turneaure and Russell's Public Water-supplies 8vo, 5 00
Van Deventer's Physical Chemistry for Beginners. (Boltwood.) 12mo, 1 50
* Walke's Lectures on Explosives 8vo, 4 00
Washington's Manual of the Chemical Analysis of Rocks 8vo, 2 00
Wassermann's Immune Sera: Hæmolysins, Cytotoxins, and Precipitins. (Bolduan.) 12mo, 1 00
Well's Laboratory Guide in Qualitative Chemical Analysis 8vo, 1 50
Short Course in Inorganic Qualitative Chemical Analysis for Engineering Students 12mo, 1 50
Text-book of Chemical Arithmetic 12mo, 1 25
Whipple's Microscopy of Drinking-water 8vo, 3 50
Wilson's Cyanide Processes 12mo, 1 50
Chlorination Process 12mo, 1 50
Wulling's Elementary Course in Inorganic, Pharmaceutical, and Medical Chemistry 12mo, 2 00

CIVIL ENGINEERING.

BRIDGES AND ROOFS. HYDRAULICS. MATERIALS OF ENGINEERING. RAILWAY ENGINEERING.

Baker's Engineers' Surveying Instruments 12mo, 3 00
Bixby's Graphical Computing Table ..... Paper 19½ × 24½ inches. 25
** Burr's Ancient and Modern Engineering and the Isthmian Canal. (Postage, 27 cents additional.) 8vo, 3 50
Comstock's Field Astronomy for Engineers 8vo, 2 50
Davis's Elevation and Stadia Tables 8vo, 1 00
Elliott's Engineering for Land Drainage 12mo, 1 50
Practical Farm Drainage 12mo, 1 00
*Fiebeger's Treatise on Civil Engineering 8vo, 5 00
Folwell's Sewerage. (Designing and Maintenance.) 8vo, 3 00
Freitag's Architectural Engineering. 2d Edition, Rewritten 8vo, 3 50
French and Ives's Stereotomy 8vo, 2 50
Goodhue's Municipal Improvements 12mo, 1 75
Goodrich's Economic Disposal of Towns' Refuse 8vo, 3 50
Gore's Elements of Geodesy 8vo, 2 50
Hayford's Text-book of Geodetic Astronomy 8vo, 3 00
Hering's Ready Reference Tables (Conversion Factors) ..... 16mo, morocco, 2 50

Howe's Retaining Walls for Earth. 12mo, 1 25
Johnson's (J. B.) Theory and Practice of Surveying. . . . . Small 8vo, 4 00
Johnson's (L. J.) Statics by Algebraic and Graphic Methods. 8vo, 2 00
Laplace's Philosophical Essay on Probabilities. (Truscott and Emory.). 12mo, 2 00
Mahan's Treatise on Civil Engineering. (1873.) (Wood.). 8vo, 5 00
* Descriptive Geometry. 8vo, 1 50
Merriman's Elements of Precise Surveying and Geodesy. 8vo, 2 50
Elements of Sanitary Engineering. 8vo, 2 00
Merriman and Brooks's Handbook for Surveyors. . . . . 16mo, morocco, 2 00
Nugent's Plane Surveying. 8vo, 3 50
Ogden's Sewer Design. 12mo, 2 00
Patton's Treatise on Civil Engineering. . . . . 8vo half leather, 7 50
Reed's Topographical Drawing and Sketching 4to, 5 00
Rideal's Sewage and the Bacterial Purification of Sewage. 8vo, 3 50
Siebert and Biggin's Modern Stone-cutting and Masonry. 8vo, 1 50
Smith's Manual of Topographical Drawing. (McMillan.). 8vo, 2 50
Sondericker's Graphic Statics, with Applications to Trusses, Beams, and Arches. 8vo, 2 00
Taylor and Thompson's Treatise on Concrete, Plain and Reinforced. . . . 8vo, 5 00
* Trautwine's Civil Engineer's Pocket-book. . . . . 16mo, morocco, 5 00
Wait's Engineering and Architectural Jurisprudence. 8vo, 6 00
Sheep, 6 50
Law of Operations Preliminary to Construction in Engineering and Architecture. 8vo, 5 00
Sheep, 5 50
Law of Contracts. 8vo, 3 00
Warren's Stereotomy—Problems in Stone-cutting. 8vo, 2 50
Webb's Problems in the Use and Adjustment of Engineering Instruments. 16mo, morocco, 1 25
* Wheeler's Elementary Course of Civil Engineering. 8vo, 4 00
Wilson's Topographic Surveying. 8vo, 3 50

BRIDGES AND ROOFS.

Boller's Practical Treatise on the Construction of Iron Highway Bridges. 8vo, 2 00
* Thames River Bridge. . . . . 4to, paper, 5 00
Burr's Course on the Stresses in Bridges and Roof Trusses, Arched Ribs, and Suspension Bridges. 8vo, 3 50
Burr and Falk's Influence Lines for Bridge and Roof Computations. . . 8vo, 3 00
Du Bois's Mechanics of Engineering. Vol. II. . . . . Small 4to, 10 00
Foster's Treatise on Wooden Trestle Bridges. 4to, 5 00
Fowler's Ordinary Foundations. 8vo, 3 50
Greene's Roof Trusses. 8vo, 1 25
Bridge Trusses. 8vo, 2 50
Arches in Wood, Iron, and Stone. 8vo, 2 50
Howe's Treatise on Arches. 8vo, 4 00
Design of Simple Roof-trusses in Wood and Steel. 8vo, 2 00
Johnson, Bryan, and Turneaure's Theory and Practice in the Designing of Modern Framed Structures. . . . . Small 4to, 10 00
Merriman and Jacoby's Text-book on Roofs and Bridges:
Part I. Stresses in Simple Trusses. 8vo, 2 50
Part II. Graphic Statics. 8vo, 2 50
Part III. Bridge Design. 8vo, 2 50
Part IV. Higher Structures. 8vo, 2 50
Morison's Memphis Bridge. 4to, 10 00
Waddell's De Pontibus, a Pocket-book for Bridge Engineers. 16mo, morocco, 3 00
Specifications for Steel Bridges. 12mo, 1 25
Wood's Treatise on the Theory of the Construction of Bridges and Roofs. 8vo, 2 00
Wright's Designing of Draw-spans:
Part I. Plate-girder Draws. 8vo, 2 50
Part II. Riveted-truss and Pin-connected Long-span Draws. 8vo, 2 50
Two parts in one volume. 8vo, 3 50

HYDRAULICS.

Bazin's Experiments upon the Contraction of the Liquid Vein Issuing from an Orifice. (Trautwine.)	8vo,	2 00
Bovey's Treatise on Hydraulics	8vo,	5 00
Church's Mechanics of Engineering	8vo,	6 00
Diagrams of Mean Velocity of Water in Open Channels	paper,	1 50
Coffin's Graphical Solution of Hydraulic Problems	16mo, morocco,	2 50
Flather's Dynamometers, and the Measurement of Power	12mo,	3 00
Folwell's Water-supply Engineering	8vo,	4 00
Frizell's Water-power	8vo,	5 00
Fuertes's Water and Public Health	12mo,	1 50
Water-filtration Works	12mo,	2 50
Ganguillet and Kutter's General Formula for the Uniform Flow of Water in Rivers and Other Channels. (Hering and Trautwine.)	8vo,	4 00
Hazen's Filtration of Public Water-supply	8vo,	3 00
Hazlehurst's Towers and Tanks for Water-works	8vo,	2 50
Herschel's 115 Experiments on the Carrying Capacity of Large, Riveted, Metal Conduits	8vo,	2 00
Mason's Water-supply. (Considered Principally from a Sanitary Standpoint.)	8vo,	4 00
Merriman's Treatise on Hydraulics	8vo,	5 00
* Michie's Elements of Analytical Mechanics	8vo,	4 00
Schuyler's Reservoirs for Irrigation, Water-power, and Domestic Water-supply	Large 8vo,	5 00
** Thomas and Watt's Improvement of Rivers. (Post., 44c. additional.)	4to,	6 00
Turneaure and Russell's Public Water-supplies	8vo,	5 00
Wegmann's Design and Construction of Dams	4to,	5 00
Water-supply of the City of New York from 1658 to 1895	4to,	10 00
Williams and Hazen's Hydraulic Tables	8vo,	1 50
Wilson's Irrigation Engineering	Small 8vo,	4 00
Wolff's Windmill as a Prime Mover	8vo,	3 00
Wood's Turbines	8vo,	2 50
Elements of Analytical Mechanics	8vo,	3 00

MATERIALS OF ENGINEERING.

Baker's Treatise on Masonry Construction	8vo,	5 00
Roads and Pavements	8vo,	5 00
Black's United States Public Works	Oblong 4to,	5 00
Bovey's Strength of Materials and Theory of Structures	8vo,	7 50
Burr's Elasticity and Resistance of the Materials of Engineering	8vo,	7 50
Byrne's Highway Construction	8vo,	5 00
Inspection of the Materials and Workmanship Employed in Construction	16mo,	3 00
Church's Mechanics of Engineering	8vo,	6 00
Du Bois's Mechanics of Engineering. Vol. I	Small 4to,	7 50
*Eckel's Cements, Limes, and Plasters	8vo,	6 00
Johnson's Materials of Construction	Large 8vo,	6 00
Fowler's Ordinary Foundations	8vo,	3 50
Keep's Cast Iron	8vo,	2 50
Lanza's Applied Mechanics	8vo,	7 50
Marten's Handbook on Testing Materials. (Henning.) 2 vols	8vo,	7 50
Merrill's Stones for Building and Decoration	8vo,	5 00
Merriman's Mechanics of Materials	8vo,	5 00
Strength of Materials	12mo,	1 00
Metcalf's Steel. A Manual for Steel-users	12mo,	2 00
Patton's Practical Treatise on Foundations	8vo,	5 00
Richardson's Modern Asphalt Pavements	8vo,	3 00
Richey's Handbook for Superintendents of Construction	16mo, mor.,	4 00
Rockwell's Roads and Pavements in France	12mo,	1 25

Sabin's Industrial and Artistic Technology of Paints and Varnish.....8vo, 3 00
Smith's Materials of Machines.....12mo, 1 00
Snow's Principal Species of Wood.....8vo, 3 50
Spalding's Hydraulic Cement.....12mo, 2 00
Text-book on Roads and Pavements.....12mo, 2 00
Taylor and Thompson's Treatise on Concrete, Plain and Reinforced.....8vo, 5 00
Thurston's Materials of Engineering. 3 Parts.....8vo, 8 00
Part I. Non-metallic Materials of Engineering and Metallurgy.....8vo, 2 00
Part II. Iron and Steel.....8vo, 3 50
Part III. A Treatise on Brasses, Bronzes, and Other Alloys and their Constituents.....8vo, 2 50
Thurston's Text-book of the Materials of Construction.....8vo, 5 00
Tillson's Street Pavements and Paving Materials.....8vo, 4 00
Waddell's De Pontibus. (A Pocket-book for Bridge Engineers.)..16mo, mor., 3 00
Specifications for Steel Bridges.....12mo, 1 25
Wood's (De V.) Treatise on the Resistance of Materials, and an Appendix on the Preservation of Timber.....8vo, 2 00
Wood's (De V.) Elements of Analytical Mechanics.....8vo, 3 00
Wood's (M. P.) Rustless Coatings: Corrosion and Electrolysis of Iron and Steel.....8vo, 4 00

RAILWAY ENGINEERING.

Andrew's Handbook for Street Railway Engineers.....3x5 inches, morocco, 1 25
Berg's Buildings and Structures of American Railroads.....4to, 5 00
Brook's Handbook of Street Railroad Location.....16mo, morocco, 1 50
Butt's Civil Engineer's Field-book.....16mo, morocco, 2 50
Crandall's Transition Curve.....16mo, morocco, 1 50
Railway and Other Earthwork Tables.....8vo, 1 50
Dawson's "Engineering" and Electric Traction Pocket-book..16mo, morocco, 5 00
Dredge's History of the Pennsylvania Railroad: (1879).....Paper, 5 00
* Drinker's Tunnelling, Explosive Compounds, and Rock Drills..4to, half mor., 25 00
Fisher's Table of Cubic Yards.....Cardboard, 25
Godwin's Railroad Engineers' Field-book and Explorers' Guide...16mo, mor., 2 50
Howard's Transition Curve Field-book.....16mo, morocco, 1 50
Hudson's Tables for Calculating the Cubic Contents of Excavations and Embankments.....8vo, 1 00
Molitor and Beard's Manual for Resident Engineers.....16mo, 1 00
Nagle's Field Manual for Railroad Engineers.....16mo, morocco, 3 00
Philbrick's Field Manual for Engineers.....16mo, morocco, 3 00
Searles's Field Engineering.....16mo, morocco, 3 00
Railroad Spiral.....16mo, morocco, 1 50
Taylor's Prismoidal Formulæ and Earthwork.....8vo, 1 50
* Trautwine's Method of Calculating the Cube Contents of Excavations and Embankments by the Aid of Diagrams.....8vo, 2 00
The Field Practice of Laying Out Circular Curves for Railroads.....12mo, morocco, 2 50
Cross-section Sheet.....Paper, 25
Webb's Railroad Construction.....16mo, morocco, 5 00
Wellington's Economic Theory of the Location of Railways.....Small 8vo, 5 00

DRAWING.

Barr's Kinematics of Machinery.....8vo, 2 50
* Bartlett's Mechanical Drawing.....8vo, 3 00
* " " " Abridged Ed.....8vo, 1 50
Coolidge's Manual of Drawing.....8vo, paper 1 00
Coolidge and Freeman's Elements of General Drafting for Mechanical Engineers.....Oblong 4to, 2 50
Durley's Kinematics of Machines.....8vo, 4 00
Emch's Introduction to Projective Geometry and its Applications.....8vo. 2 50

Hill's Text-book on Shades and Shadows, and Perspective..... 8vo, 2 00
Jamison's Elements of Mechanical Drawing..... 8vo, 2 50
Advanced Mechanical Drawing..... 8vo, 2 00
Jones's Machine Design:
Part I. Kinematics of Machinery..... 8vo, 1 50
Part II. Form, Strength, and Proportions of Parts..... 8vo, 3 00
MacCord's Elements of Descriptive Geometry..... 8vo, 3 00
Kinematics; or, Practical Mechanism..... 8vo, 5 00
Mechanical Drawing..... 4to, 4 00
Velocity Diagrams..... 8vo, 1 50
Mahan's Descriptive Geometry and Stone-cutting..... 8vo, 1 50
Industrial Drawing. (Thompson.)..... 8vo, 3 50
Meyer's Descriptive Geometry..... 8vo, 2 00
Reed's Topographical Drawing and Sketching..... 4to, 5 00
Reid's Course in Mechanical Drawing..... 8vo, 2 00
Text-book of Mechanical Drawing and Elementary Machine Design 8vo, 3 00
Robinson's Principles of Mechanism..... 8vo, 3 00
Schwamb and Merrill's Elements of Mechanism..... 8vo, 3 00
Smith's Manual of Topographical Drawing. (McMillan.)..... 8vo, 2 50
Warren's Elements of Plane and Solid Free-hand Geometrical Drawing 12mo, 1 00
Drafting Instruments and Operations..... 12mo, 1 25
Manual of Elementary Projection Drawing..... 12mo, 1 50
Manual of Elementary Problems in the Linear Perspective of Form and Shadow..... 12mo, 1 00
Plane Problems in Elementary Geometry..... 12mo, 1 25
Primary Geometry..... 12mo, 75
Elements of Descriptive Geometry, Shadows, and Perspective..... 8vo, 3 50
General Problems of Shades and Shadows..... 8vo, 3 00
Elements of Machine Construction and Drawing..... 8vo, 7 50
Problems, Theorems, and Examples in Descriptive Geometry..... 8vo, 2 50
Weisbach's Kinematics and Power of Transmission. (Hermann and Klein.)..... 8vo, 5 00
Wheelwright's Practical Instruction in the Art of Letter Engraving..... 12mo, 2 00
Wilson's (H. M.) Topographic Surveying..... 8vo, 3 50
Wilson's (V. T.) Free-hand Perspective..... 8vo, 2 50
Wilson's (V. T.) Free-hand Lettering..... 8vo, 1 00
Woolf's Elementary Course in Descriptive Geometry..... Large 8vo, 3 00

ELECTRICITY AND PHYSICS.

Anthony and Brackett's Text-book of Physics. (Magie.)..... Small 8vo, 3 00
Anthony's Lecture-notes on the Theory of Electrical Measurements..... 12mo, 1 00
Benjamin's History of Electricity..... 8vo, 3 00
Voltaic Cell..... 8vo, 3 00
Classen's Quantitative Chemical Analysis by Electrolysis. (Boltwood.)..... 8vo, 3 00
Crehore and Squier's Polarizing Photo-chronograph..... 8vo, 3 00
Dawson's "Engineering" and Electric Traction Pocket-book..... 16mo, morocco, 5 00
Dolezalek's Theory of the Lead Accumulator (Storage Battery). (Von Ende.)..... 12mo, 2 50
Duhem's Thermodynamics and Chemistry. (Burgess.)..... 8vo, 4 00
Flather's Dynamometers, and the Measurement of Power..... 12mo, 3 00
Gilbert's De Magnete. (Mottelay.)..... 8vo, 2 50
Hanchett's Alternating Currents Explained..... 12mo, 1 00
Hering's Ready Reference Tables (Conversion Factors)..... 16mo, morocco, 2 50
Holman's Precision of Measurements..... 8vo, 2 00
Telescopic Mirror-scale Method, Adjustments, and Tests..... Large 8vo, 75
Kinzbrunner's Testing of Continuous-Current Machines..... 8vo, 2 00
Landauer's Spectrum Analysis. (Tingle.)..... 8vo, 3 00
Le Chatelier's High-temperature Measurements. (Boudouard—Burgess.)..... 12mo, 3 00
Löb's Electrolysis and Electrosynthesis of Organic Compounds. (Lorenz.)..... 12mo, 1 00

* Lyons's Treatise on Electromagnetic Phenomena. Vols. I. and II. 8vo, each, 6 00
* Michie's Elements of Wave Motion Relating to Sound and Light. 8vo, 4 00
Niaudet's Elementary Treatise on Electric Batteries. (Fishback.) 12mo, 2 50
* Rosenberg's Electrical Engineering. (Haldane Gee—Kinzbrunner.) 8vo, 1 50
Ryan, Norris, and Hoxie's Electrical Machinery. Vol. I. 8vo, 2 50
Thurston's Stationary Steam-engines. 8vo, 2 50
* Tillman's Elementary Lessons in Heat. 8vo, 1 50
Tory and Pitcher's Manual of Laboratory Physics. Small 8vo, 2 00
Ulke's Modern Electrolytic Copper Refining. 8vo, 3 00

LAW.

* Davis's Elements of Law. 8vo, 2 50
* Treatise on the Military Law of United States. 8vo, 7 00
* Sheep, 7 50
Manual for Courts-martial. 16mo, morocco, 1 50
Wait's Engineering and Architectural Jurisprudence. 8vo, 6 00
Sheep, 6 50
Law of Operations Preliminary to Construction in Engineering and Architecture. 8vo, 5 00
Sheep, 5 50
Law of Contracts. 8vo, 3 00
Winthrop's Abridgment of Military Law. 12mo, 2 50

MANUFACTURES.

Bernadou's Smokeless Powder—Nitro-cellulose and Theory of the Cellulose Molecule 12mo, 2 50
Bolland's Iron Founder. 12mo, 2 50
"The Iron Founder," Supplement. 12mo, 2 50
Encyclopedia of Founding and Dictionary of Foundry Terms Used in the Practice of Moulding. 12mo, 3 00
Eissler's Modern High Explosives. 8vo, 4 00
Effront's Enzymes and their Applications. (Prescott.) 8vo, 3 00
Fitzgerald's Boston Machinist. 12mo, 1 00
Ford's Boiler Making for Boiler Makers. 18mo, 1 00
Hopkin's Oil-chemists' Handbook. 8vo, 3 00
Keep's Cast Iron. 8vo, 2 50
Leach's The Inspection and Analysis of Food with Special Reference to State Control. Large 8vo, 7 50
Matthews's The Textile Fibres. 8vo, 3 50
Metcalf's Steel. A Manual for Steel-users. 12mo, 2 00
Metcalfe's Cost of Manufactures—And the Administration of Workshops 8vo, 5 00
Meyer's Modern Locomotive Construction. 4to, 10 00
Morse's Calculations used in Cane-sugar Factories. 16mo, morocco, 1 50
* Reisig's Guide to Piece-dyeing. 8vo, 25 00
Sabin's Industrial and Artistic Technology of Paints and Varnish. 8vo, 3 00
Smith's Press-working of Metals. 8vo, 3 00
Spalding's Hydraulic Cement. 12mo, 2 00
Spencer's Handbook for Chemists of Beet-sugar Houses. 16mo, morocco, 3 00
Handbook for Sugar Manufacturers and their Chemists. 16mo, morocco, 2 00
Taylor and Thompson's Treatise on Concrete, Plain and Reinforced. 8vo, 5 00
Thurston's Manual of Steam-boilers, their Designs, Construction and Operation. 8vo, 5 00
* Walke's Lectures on Explosives. 8vo, 4 00
Ware's Manufacture of Sugar. (In press.)
West's American Foundry Practice. 12mo, 2 50
Moulder's Text-book. 12mo, 2 50

Wolff's Windmill as a Prime Mover 8vo, 3 00
Wood's Rustless Coatings: Corrosion and Electrolysis of Iron and Steel. 8vo, 4 00

MATHEMATICS.

Baker's Elliptic Functions 8vo, 1 50
* Bass's Elements of Differential Calculus 12mo, 4 50
Briggs's Elements of Plane Analytic Geometry 12mo, 1 00
Compton's Manual of Logarithmic Computations 12mo, 1 50
Davis's Introduction to the Logic of Algebra 8vo, 1 50
* Dickson's College Algebra ..... Large 12mo, 1 50
* Introduction to the Theory of Algebraic Equations ..... Large 12mo, 1 25
Emch's Introduction to Projective Geometry and its Applications 8vo, 2 50
Halsted's Elements of Geometry 8vo, 1 75
Elementary Synthetic Geometry 8vo, 1 50
Rational Geometry 12mo, 1 75
* Johnson's (J. B.) Three-place Logarithmic Tables: Vest-pocket size paper, 15
100 copies for 5 00
* Mounted on heavy cardboard, 8 × 10 inches, 25
10 copies for 2 00
Johnson's (W. W.) Elementary Treatise on Differential Calculus. Small 8vo, 3 00
Johnson's (W. W.) Elementary Treatise on the Integral Calculus. Small 8vo, 1 50
Johnson's (W. W.) Curve Tracing in Cartesian Co-ordinates 12mo, 1 00
Johnson's (W. W.) Treatise on Ordinary and Partial Differential Equations. Small 8vo, 3 50
Johnson's (W. W.) Theory of Errors and the Method of Least Squares. 12mo, 1 50
* Johnson's (W. W.) Theoretical Mechanics 12mo, 3 00
Laplace's Philosophical Essay on Probabilities. (Truscott and Emory.) 12mo, 2 00
* Ludlow and Bass. Elements of Trigonometry and Logarithmic and Other Tables 8vo, 3 00
Trigonometry and Tables published separately ..... Each, 2 00
* Ludlow's Logarithmic and Trigonometric Tables 8vo, 1 00
Maurer's Technical Mechanics 8vo, 4 00
Merriman and Woodward's Higher Mathematics 8vo, 5 00
Merriman's Method of Least Squares 8vo, 2 00
Rice and Johnson's Elementary Treatise on the Differential Calculus. Sm. 8vo, 3 00
Differential and Integral Calculus. 2 vols. in one ..... Small 8vo, 2 50
Wood's Elements of Co-ordinate Geometry 8vo, 2 00
Trigonometry: Analytical, Plane, and Spherical 12mo, 1 00

MECHANICAL ENGINEERING.

MATERIALS OF ENGINEERING, STEAM-ENGINES AND BOILERS.

Bacon's Forge Practice 12mo, 1 50
Baldwin's Steam Heating for Buildings 12mo, 2 50
Barr's Kinematics of Machinery 8vo, 2 50
* Bartlett's Mechanical Drawing 8vo, 3 00
* " " " Abridged Ed. 8vo, 1 50
Benjamin's Wrinkles and Recipes 12mo, 2 00
Carpenter's Experimental Engineering 8vo, 6 00
Heating and Ventilating Buildings 8vo, 4 00
Cary's Smoke Suppression in Plants using Bituminous Coal. (In Preparation.)
Clark's Gas and Oil Engine ..... Small 8vo, 4 00
Coolidge's Manual of Drawing ..... 8vo, paper, 1 00
Coolidge and Freeman's Elements of General Drafting for Mechanical Engineers ..... Oblong 4to, 2 50

Cromwell's Treatise on Toothed Gearing.....12mo, 1 50
Treatise on Belts and Pulleys.....12mo, 1 50
Durley's Kinematics of Machines.....8vo, 4 00
Flather's Dynamometers and the Measurement of Power.....12mo, 3 00
Rope Driving.....12mo, 2 00
Gill's Gas and Fuel Analysis for Engineers.....12mo, 1 25
Hall's Car Lubrication.....12mo, 1 00
Hering's Ready Reference Tables (Conversion Factors).....16mo, morocco, 2 50
Hutton's The Gas Engine.....8vo, 5 00
Jamison's Mechanical Drawing.....8vo, 2 50
Jones's Machine Design:
Part I. Kinematics of Machinery.....8vo, 1 50
Part II. Form, Strength, and Proportions of Parts.....8vo, 3 00
Kent's Mechanical Engineers' Pocket-book.....16mo, morocco, 5 00
Kerr's Power and Power Transmission.....8vo, 2 00
Leonard's Machine Shop, Tools, and Methods.....8vo, 4 00
*Lorenz's Modern Refrigerating Machinery. (Pope, Haven, and Dean.).8vo, 4 00
MacCord's Kinematics; or, Practical Mechanism.....8vo, 5 00
Mechanical Drawing.....4to, 4 00
Velocity Diagrams.....8vo, 1 50
Mahan's Industrial Drawing. (Thompson.).....8vo, 3 50
Poole's Calorific Power of Fuels.....8vo, 3 00
Reid's Course in Mechanical Drawing.....8vo, 2 00
Text-book of Mechanical Drawing and Elementary Machine Design.8vo, 3 00
Richard's Compressed Air.....12mo, 1 50
Robinson's Principles of Mechanism.....8vo, 3 00
Schwamb and Merrill's Elements of Mechanism.....8vo, 3 00
Smith's Press-working of Metals.....8vo, 3 00
Thurston's Treatise on Friction and Lost Work in Machinery and Mill Work.....8vo, 3 00
Animal as a Machine and Prime Motor, and the Laws of Energetics.12mo, 1 00
Warren's Elements of Machine Construction and Drawing.....8vo, 7 50
Weisbach's Kinematics and the Power of Transmission. (Herrmann—Klein.).....8vo, 5 00
Machinery of Transmission and Governors. (Herrmann—Klein.).8vo, 5 00
Wolff's Windmill as a Prime Mover.....8vo, 3 00
Wood's Turbines.....8vo, 2 50

MATERIALS OF ENGINEERING.

Bovey's Strength of Materials and Theory of Structures.....8vo, 7 50
Burr's Elasticity and Resistance of the Materials of Engineering. 6th Edition. Reset.....8vo, 7 50
Church's Mechanics of Engineering.....8vo, 6 00
Johnson's Materials of Construction.....8vo, 6 00
Keep's Cast Iron.....8vo, 2 50
Lanza's Applied Mechanics.....8vo, 7 50
Martens's Handbook on Testing Materials. (Henning.).....8vo, 7 50
Merriman's Mechanics of Materials.....8vo, 5 00
Strength of Materials.....12mo, 1 00
Metcalf's Steel. A manual for Steel-users.....12mo, 2 00
Sabin's Industrial and Artistic Technology of Paints and Varnish.....8vo, 3 00
Smith's Materials of Machines.....12mo, 1 00
Thurston's Materials of Engineering.....3 vols., 8vo, 8 00
Part II. Iron and Steel.....8vo, 3 50
Part III. A Treatise on Brasses, Bronzes, and Other Alloys and their Constituents.....8vo, 2 50
Text-book of the Materials of Construction.....8vo, 5 00

Wood's (De V.) Treatise on the Resistance of Materials and an Appendix on the Preservation of Timber. 8vo, 2 00
Wood's (De V.) Elements of Analytical Mechanics. 8vo, 3 00
Wood's (M. P.) Rustless Coatings: Corrosion and Electrolysis of Iron and Steel. 8vo, 4 00

STEAM-ENGINES AND BOILERS.

Berry's Temperature-entropy Diagram. 12mo, 1 25
Carnot's Reflections on the Motive Power of Heat. (Thurston.) 12mo, 1 50
Dawson's "Engineering" and Electric Traction Pocket-book 16mo, mor., 5 00
Ford's Boiler Making for Boiler Makers. 18mo, 1 00
Goss's Locomotive Sparks. 8vo, 2 00
Hemenway's Indicator Practice and Steam-engine Economy 12mo, 2 00
Hutton's Mechanical Engineering of Power Plants. 8vo, 5 00
Heat and Heat-engines. 8vo, 5 00
Kent's Steam boiler Economy. 8vo, 4 00
Kneass's Practice and Theory of the Injector. 8vo, 1 50
MacCord's Slide-valves. 8vo, 2 00
Meyer's Modern Locomotive Construction. 4to, 10 00
Peabody's Manual of the Steam-engine Indicator. 12mo, 1 50
Tables of the Properties of Saturated Steam and Other Vapors. 8vo, 1 00
Thermodynamics of the Steam-engine and Other Heat-engines. 8vo, 5 00
Valve-gears for Steam-engines. 8vo, 2 50
Peabody and Miller's Steam-boilers. 8vo, 4 00
Pray's Twenty Years with the Indicator. Large 8vo, 2 50
Pupin's Thermodynamics of Reversible Cycles in Gases and Saturated Vapors. (Osterberg.) 12mo, 1 25
Reagan's Locomotives: Simple Compound, and Electric. 12mo, 2 50
Rontgen's Principles of Thermodynamics. (Du Bois.) 8vo, 5 00
Sinclair's Locomotive Engine Running and Management. 12mo, 2 00
Smart's Handbook of Engineering Laboratory Practice. 12mo, 2 50
Snow's Steam-boiler Practice. 8vo, 3 00
Spangler's Valve-gears. 8vo, 2 50
Notes on Thermodynamics. 12mo, 1 00
Spangler, Greene, and Marshall's Elements of Steam-engineering. 8vo, 3 00
Thurston's Handy Tables. 8vo, 1 50
Manual of the Steam-engine. 2 vols., 8vo, 10 00
Part I. History, Structure, and Theory. 8vo, 6 00
Part II. Design, Construction, and Operation. 8vo, 6 00
Handbook of Engine and Boiler Trials, and the Use of the Indicator and the Prony Brake. 8vo, 5 00
Stationary Steam-engines. 8vo, 2 50
Steam-boiler Explosions in Theory and in Practice 12mo, 1 50
Manual of Steam-boilers, their Designs, Construction, and Operation. 8vo, 5 00
Weisbach's Heat, Steam, and Steam-engines. (Du Bois.) 8vo, 5 00
Whitham's Steam-engine Design. 8vo, 5 00
Wilson's Treatise on Steam-boilers. (Flather.) 16mo, 2 50
Wood's Thermodynamics, Heat Motors, and Refrigerating Machines. 8vo, 4 00

MECHANICS AND MACHINERY.

Barr's Kinematics of Machinery. 8vo, 2 50
Bovey's Strength of Materials and Theory of Structures 8vo, 7 50
Chase's The Art of Pattern-making. 12mo, 2 50
Church's Mechanics of Engineering. 8vo, 6 00

Church's Notes and Examples in Mechanics. 8vo, 2 00
Compton's First Lessons in Metal-working. 12mo, 1 50
Compton and De Groodt's The Speed Lathe 12mo, 1 50
Cromwell's Treatise on Toothed Gearing. 12mo, 1 50
Treatise on Belts and Pulleys. 12mo, 1 50
Dana's Text-book of Elementary Mechanics for Colleges and Schools. . 12mo, 1 50
Dingey's Machinery Pattern Making 12mo, 2 00
Dredge's Record of the Transportation Exhibits Building of the World's Columbian Exposition of 1893. . . . . 4to half morocco, 5 00
Du Bois's Elementary Principles of Mechanics:
Vol. I. Kinematics. 8vo, 3 50
Vol. II. Statics. 8vo, 4 00
Vol. III. Kinetics. 8vo, 3 50
Mechanics of Engineering. Vol. I. . . . . Small 4to, 7 50
Vol. II. . . . . Small 4to, 10 00
Durley's Kinematics of Machines. 8vo, 4 00
Fitzgerald's Boston Machinist. 16mo, 1 00
Flather's Dynamometers, and the Measurement of Power. 12mo, 3 00
Rope Driving. 12mo, 2 00
Goss's Locomotive Sparks. 8vo, 2 00
Hall's Car Lubrication. 12mo, 1 00
Holly's Art of Saw Filing 18mo, 75
James's Kinematics of a Point and the Rational Mechanics of a Particle. Sm. 8vo, 2 00
* Johnson's (W. W.) Theoretical Mechanics. 12mo, 3 00
Johnson's (L. J.) Statics by Graphic and Algebraic Methods. 8vo, 2 00
Jones's Machine Design:
Part I. Kinematics of Machinery. 8vo, 1 50
Part II. Form, Strength, and Proportions of Parts. 8vo, 3 00
Kerr's Power and Power Transmission. 8vo, 2 00
Lanza's Applied Mechanics. 8vo, 7 50
Leonard's Machine Shop, Tools, and Methods 8vo, 4 00
*Lorenz's Modern Refrigerating Machinery. (Pope, Haven, and Dean.) 8vo, 4 00
MacCord's Kinematics; or, Practical Mechanism. 8vo, 5 00
Velocity Diagrams. 8vo, 1 50
Maurer's Technical Mechanics. 8vo, 4 00
Merriman's Mechanics of Materials. 8vo, 5 00
* Elements of Mechanics. 12mo, 1 00
* Michie's Elements of Analytical Mechanics. 8vo, 4 00
Reagan's Locomotives: Simple, Compound, and Electric. 12mo, 2 50
Reid's Course in Mechanical Drawing. 8vo, 2 00
Text-book of Mechanical Drawing and Elementary Machine Design. 8vo, 3 00
Richards's Compressed Air. 12mo, 1 50
Robinson's Principles of Mechanism. 8vo, 3 00
Ryan, Norris, and Hoxie's Electrical Machinery. Vol. I. 8vo, 2 50
Schwamb and Merrill's Elements of Mechanism. 8vo, 3 00
Sinclair's Locomotive-engine Running and Management. 12mo, 2 00
Smith's (O.) Press-working of Metals 8vo, 3 00
Smith's (A. W.) Materials of Machines. 12mo, 1 00
Spangler, Greene, and Marshall's Elements of Steam-engineering. 8vo, 3 00
Thurston's Treatise on Friction and Lost Work in Machinery and Mill Work. 8vo, 3 00
Animal as a Machine and Prime Motor, and the Laws of Energetics. 12mo, 1 00
Warren's Elements of Machine Construction and Drawing. 8vo, 7 50
Weisbach's Kinematics and Power of Transmission. (Herrmann—Klein.) 8vo, 5 00
Machinery of Transmission and Governors. (Herrmann—Klein.) 8vo, 5 00
Wood's Elements of Analytical Mechanics. 8vo, 3 00
Principles of Elementary Mechanics. 12mo, 1 25
Turbines. 8vo, 2 50
The World's Columbian Exposition of 1893 . . . . . 4to, 1 00

METALLURGY.

Egleston's Metallurgy of Silver, Gold, and Mercury:
- Vol. I. Silver. 8vo, 7 50
- Vol. II. Gold and Mercury. 8vo, 7 50

** Iles's Lead-smelting. (Postage 9 cents additional.) 12mo, 2 50
Keep's Cast Iron. 8vo, 2 50
Kunhardt's Practice of Ore Dressing in Europe. 8vo, 1 50
Le Chatelier's High-temperature Measurements. (Boudouard—Burgess.) 12mo, 3 00
Metcalf's Steel. A Manual for Steel-users 12mo, 2 00
Smith's Materials of Machines. 12mo, 1 00
Thurston's Materials of Engineering. In Three Parts. 8vo 8 00
- Part II. Iron and Steel. 8vo, 3 50
- Part III. A Treatise on Brasses, Bronzes, and Other Alloys and their Constituents. 8vo, 2 50

Ulke's Modern Electrolytic Copper Refining. 8vo, 3 00

MINERALOGY.

Barringer's Description of Minerals of Commercial Value. Oblong, morocco, 2 50
Boyd's Resources of Southwest Virginia. 8vo, 3 00
- Map of Southwest Virginia. ..... Pocket-book form. 2 00

Brush's Manual of Determinative Mineralogy. (Penfield.) 8vo, 4 00
Chester's Catalogue of Minerals. ..... 8vo, paper, 1 00
Cloth, 1 25
- Dictionary of the Names of Minerals. 8vo, 3 50

Dana's System of Mineralogy. ..... Large 8vo, half leather, 12 50
- First Appendix to Dana's New "System of Mineralogy." ..... Large 8vo, 1 00
- Text-book of Mineralogy. 8vo, 4 00
- Minerals and How to Study Them 12mo, 1 50
- Catalogue of American Localities of Minerals. ..... Large 8vo, 1 00
- Manual of Mineralogy and Petrography. 12mo 2 00

Douglas's Untechnical Addresses on Technical Subjects. 12mo, 1 00
Eakle's Mineral Tables. 8vo, 1 25
Egleston's Catalogue of Minerals and Synonyms. 8vo, 2 50
Hussak's The Determination of Rock-forming Minerals. (Smith.) Small 8vo, 2 00
Merrill's Non-metallic Minerals: Their Occurrence and Uses 8vo, 4 00
* Penfield's Notes on Determinative Mineralogy and Record of Mineral Tests. 8vo paper, 0 50
Rosenbusch's Microscopical Physiography of the Rock-making Minerals (Iddings.) 8vo 5 00
* Tillman's Text-book of Important Minerals and Rocks. 8vo, 2 00
Williams's Manual of Lithology. 8vo, 3 00

MINING.

Beard's Ventilation of Mines. 12mo, 2 50
Boyd's Resources of Southwest Virginia. 8vo, 3 00
- Map of Southwest Virginia. ..... Pocket book form, 2 00

Douglas's Untechnical Addresses on Technical Subjects 12mo, 1 00
* Drinker's Tunneling, Explosive Compounds, and Rock Drills. 4to, hf mor 25 00
Eissler's Modern High Explosives 8vo 4 00
Fowler's Sewage Works Analyses. 12mo 2 00
Goodyear's Coal-mines of the Western Coast of the United States 12mo 2 50
Ihlseng's Manual of Mining. 8vo, 5 00
** Iles's Lead-smelting. (Postage 9c. additional.) 12mo, 2 50
Kunhardt's Practice of Ore Dressing in Europe 8vo, 1 50
O'Driscoll's Notes on the Treatment of Gold Ores. 8vo, 2 00
* Walke's Lectures on Explosives. 8vo, 4 00
Wilson's Cyanide Processes. 12mo, 1 50
- Chlorination Process. 12mo, 1 50

Wilson's Hydraulic and Placer Mining.....12mo, 2 00
Treatise on Practical and Theoretical Mine Ventilation.....12mo, 1 25

SANITARY SCIENCE.

Bashore's Sanitation of a Country House.....12mo, 1 00
Folwell's Sewerage. (Designing, Construction, and Maintenance.).....8vo, 3 00
Water-supply Engineering.....8vo, 4 00
Fuertes's Water and Public Health.....12mo, 1 50
Water-filtration Works.....12mo, 2 50
Gerhard's Guide to Sanitary House-inspection.....16mo, 1 00
Goodrich's Economic Disposal of Town's Refuse.....Demy 8vo, 3 50
Hazen's Filtration of Public Water-supplies.....8vo, 3 00
Leach's The Inspection and Analysis of Food with Special Reference to State Control.....8vo, 7 50
Mason's Water-supply. (Considered principally from a Sanitary Standpoint) 8vo, 4 00
Examination of Water. (Chemical and Bacteriological.).....12mo, 1 25
Merriman's Elements of Sanitary Engineering.....8vo, 2 00
Ogden's Sewer Design.....12mo, 2 00
Prescott and Winslow's Elements of Water Bacteriology, with Special Reference to Sanitary Water Analysis.....12mo, 1 25
* Price's Handbook on Sanitation.....12mo, 1 50
Richards's Cost of Food. A Study in Dietaries.....12mo, 1 00
Cost of Living as Modified by Sanitary Science.....12mo, 1 00
Richards and Woodman's Air, Water, and Food from a Sanitary Standpoint.....8vo, 2 00
* Richards and Williams's The Dietary Computer.....8vo, 1 50
Rideal's Sewage and Bacterial Purification of Sewage.....8vo, 3 50
Turneaure and Russell's Public Water-supplies.....8vo, 5 00
Von Behring's Suppression of Tuberculosis. (Bolduan.).....12mo, 1 00
Whipple's Microscopy of Drinking-water.....8vo, 3 50
Woodhull's Notes on Military Hygiene.....16mo, 1 50

MISCELLANEOUS.

De Fursac's Manual of Psychiatry. (Rosanoff and Collins.)....Large 12mo, 2 50
Emmons's Geological Guide-book of the Rocky Mountain Excursion of the International Congress of Geologists.....Large 8vo, 1 50
Ferrel's Popular Treatise on the Winds.....8vo. 4 00
Haines's American Railway Management.....12mo, 2 50
Mott's Composition, Digestibility, and Nutritive Value of Food. Mounted chart, 1 25
Fallacy of the Present Theory of Sound.....16mo, 1 00
Ricketts's History of Rensselaer Polytechnic Institute, 1824–1894..Small 8vo, 3 00
Rostoski's Serum Diagnosis. (Bolduan.).....12mo, 1 00
Rotherham's Emphasized New Testament.....Large 8vo, 2 00
Steel's Treatise on the Diseases of the Dog.....8vo, 3 50
Totten's Important Question in Metrology.....8vo. 2 50
The World's Columbian Exposition of 1893.....4to, 1 00
Von Behring's Suppression of Tuberculosis. (Bolduan.).....12mo, 1 00
Winslow's Elements of Applied Microscopy.....12mo, 1 50
Worcester and Atkinson. Small Hospitals, Establishment and Maintenance; Suggestions for Hospital Architecture: Plans for Small Hospital.12mo, 1 25

HEBREW AND CHALDEE TEXT-BOOKS.

Green's Elementary Hebrew Grammar.....12mo, 1 25
Hebrew Chrestomathy.....8vo, 2 00
Gesenius's Hebrew and Chaldee Lexicon to the Old Testament Scriptures. (Tregelles.).....Small 4to, half morocco, 5 00
Letteris's Hebrew Bible.....8vo, 2 25